GREAT BOOKS OF THE WESTERN WORLD

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WILLIAM JAMES

The Principles of Psychology

BY

WILLIAM JAMES

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BIOGRAPHICAL NOTE

William James 184 -1910

The founder of the James dyna ty in America William James emigrated from Irela d in 1 89 Upon his death he left a fortune wh ch enabled his heirs to becom financially independent upon coming of a e For the most part this ... unregulated clu ter with free-living ... unts per ... ry James ... the James ... from any ... a ... truth say ... f you like or best of all ... ju t sa I m a tudent, ...

William and Henry were born in New York within fifteen months of each other and always mainta ned a warm intimate relation hip Even as a boy Will am man fested the extraordinary personal and intellectual gifts which ... later life Henry records that occa ons waited on ... as with the action ... lder Henry s restless wanderings on the cont ... sons be someth n someth n unconnected with specific do n something free and uncommitted the bo s rece ved schoolin irregularly in London Paris Boulogne-sur Mer Geneva and Bonn This type of education was admirabl uited to the temper ... whose a imilat on to the career of writ n except for ... e tarts was ... sively stud ...

he seems to ha e had no intent ... fe ... nal sphe e was accompanied by a se ere mental depression He seems like his father to ha e suffe ed an acute sp ritual crisis As the senior Henry f und a satisfactory explanation of God s relat on to man in the religious ... f Swedenborg o William was delivered from the deterministic uni ... f ... will My ... ll ... vard The ppo ntment to teach phys ology is a perfect ... t now he wrote to his brother Henry an external motive to work—dealing with men in tead f my own mind and a d vers on from those introspect ve s udies which had bred a sort of ph losoph cal h pocho dria in me of late In 1875 he ga a course on The Relat on between Physiology and P ychology" and set up the first laboratory in America for expe iment n in this f eld

In the summer of 1878 James married Alice Gibbens a Boston school teacher In the same year he signed a contract to produce a text book in psychology by 1880 But the work grew under his hand and appeared as the two volume *Principles of Psychology* in 1890 After publication of the *Principles* James lost interest in this nasty little subject all one cares to know lies outside it

The publication of the *Principles* brought in its wake a flood of invitations to lecture before various groups throughout the country Many of these were collected in *The Will to Believe and Other Essays in Popular Philosophy* (1897) *Human Immortality* (1898) and *Talks to Teachers on Psychology and to Students on Some of Life s Ideals* (1899)

James had been concerned with religion from an empirical point of view as early as 1869 when he had noted in a review the anomalous and discred

years later he was invited to give the Gifford Lectures on Natural Religion at the University of Edinburgh

On a vacation climb in the Adirondacks in 1898 James underwent a variety of religious experience It seemed as if the Gods of all the nature mythologies were holding an indescribable meeting in my breast with the moral Gods of the inner life Doubtless in more ways than one things in the Edinburgh lectures will be traceable to it he wrote his wife The climb however overtaxed

Experience

James forced to limit his teaching now turned his energies toward philosophy Thirty years before a Harvard colleague Charles Peirce had founded Pragmatism which James interpreted in a series of lectures collected as *Pragmatism A New Name for Some Old Ways of Thinking* in 1907 His replies to the criticisms this invoked appeared as *The Meaning of Truth* (1909) Does Consciousness Exist The Thing and its Relations and other studies were published posthumously as *Essays in Radical Empiricism* The same essential position was stated less technically in *A Pluralistic Universe* (1909)

James started rounding out his philosophical system but was forced to leave it an arch built only on one side to be published after his death as *Some Principles of Philosophy* In the spring of 1910 it seemed advisable for him to go to Europe for his health Too much sitting up and talking with friends more than offset any benefits he might have received and despairing of any relief he turned homeward He died two days after his return at his country home in Chocorua New Hampshire

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PREFACE

THE TREATISE which follows has in the main grown up in connection with the author's class-room instruction in Psychology, although it is true that some of the chapters are more 'metaphysical,' and others fuller of detail, than is suitable for students who are going over the subject for the first time. The consequence of this is that, in spite of the exclusion of the important subjects of pleasure and pain, and moral and æsthetic feelings and judgments, the work has grown to a length which no one can regret more than the writer himself. The man must indeed be sanguine who, in this crowded age, can hope to have many readers for fourteen hundred continuous pages from his pen. But *wer Vieles bringt wird Manchem etwas bringen*; and, by judiciously skipping according to their several needs, I am sure that many sorts of readers, even those who are just beginning the study of the subject, will find my book of use. Since the beginners are most in need of guidance, I suggest for their behoof that they omit altogether on a first reading chapters 6, 7, 8, 10 (from page 330 to page 371), 12, 13, 15, 17, 20, 21, and 28. The better to awaken the neophyte's interest, it is possible that the wise order would be to pass directly from chapter 4 to chapters 23, 24, 25, and 26, and thence to return to the first [illegible]

substitute for the entire chapter.

I have kept close to the point of view of natural science throughout the book. Every natural science assumes certain data uncritically, and declines to challenge the elements between which its own 'laws' obtain, and from which its own deductions are carried on. Psychology, the science of finite individual minds, assumes as its data (1) *thoughts and feelings*, and (2) *a physical world* in time and space with which they coexist and which (3) *they know*. Of course these data themselves are discussable; but the discussion of them (as of other elements) is called metaphysics and falls outside the province of this book. This book, assuming that thoughts and feelings exist and are vehicles of knowledge, thereupon contends that psychology when she has ascertained the empirical correlation of the various sorts of thought or feeling with definite conditions of the brain, can go no farther—can go no farther, that is, as a natural science. If she goes farther she becomes metaphysical. All attempts to explain our phenomenally given thoughts as products of deeper-lying entities (whether the latter be named 'Soul,' 'Transcendental Ego,' 'Ideas,' or 'Elementary Units of Consciousness') are metaphysical. This book consequently rejects both the associationist and the spiritualist theories; and in this strictly positivistic point of view consists the only feature of it for which I feel tempted to claim originality. Of course this point of view is any

Chapter I

THE SCOPE OF PSYCHOLOGY

Psychology is the science of mental life, both of its phenomena and of their conditions. The phenomena are such things as we call feelings, desires, cognitions, reasonings, decisions, and the like; and, superficially considered, their variety and complexity is such as to leave a chaotic impression on the observer. The most natural and consequently the earliest way of unifying the material was, first, to classify it as well as might be, and, secondly, to affiliate the diverse mental modes thus found, upon a simple entity, the personal soul, of which they are taken to be so many facultative manifestations. Now, for instance, the soul manifests its faculty of memory, now of reasoning, now of volition, or again its imagination or its appetite. This is the orthodox 'spiritualistic' theory of scholasticism and of common-sense. Another and a less obvious way of unifying the chaos is to seek common elements *in* the divers mental facts rather than a common agent behind them, and to explain them constructively by the various forms of arrangement of these elements, as one explains houses by stones and bricks. ... of Herbart in Germany, and of Hume, the Mills ... tak ... epi- ... sions, and forms of succession, ... emo- tions, volitions, passions, theories, and all the other furnishings of an individual's mind may be engendered. The very self or *ego* of the individual comes in this way to be viewed no longer as the pre-existing source of the representations, but rather as their last and most complicated fruit.

Now, if we strive rigorously to simplify the phenomena in either of these ways, we soon become aware of inadequacies in our method. Any particular cognition, for example, or recollection, is accounted for on the soul-theory by being referred to the spiritual faculties of cognition or of memory. These faculties themselves are thought of as absolute properties of the soul; that is, to take the case of memory, no reason is given why we should remember a fact as it happened, except that so to remember it constitutes the essence of our recollective power. We may, as spiritualists, try to explain our memory's failures and blunders by secondary causes. But its *successes* can invoke no factors save the existence of certain objective things to be remembered on the one hand, and of our faculty of memory on the other. When, for instance, I recall my graduation-day, and drag all its incidents and emotions up from death's dateless night, no mechanical cause can explain this process, nor can any analysis reduce it to lower terms or make its nature seem other than an ultimate *datum* which, whether we rebel or not at its mysteriousness, must simply be taken for granted if we are to psychologize at all. However the associationist may represent the present ideas as thronging and arranging themselves, still, the spiritualist insists, he has in the end to admit that *something*, be it brain, be it 'ideas,' be it 'association,' *knows* past time as past, and fills it out with this or that event. And when the spiritual-

thing but ultimate Men must keep thinking and the data assumed by psychology just like those assumed by physics and the other natural sciences must some time be overhauled The effort to overhaul them clearly and thoroughly is metaphysics but metaphysics can only perform her task well when distinctly conscious of its great extent Metaphysics fragmentary irresponsible and half awake and unconscious that she is metaphysical spoils two good things when she injects herself into a natural science And it seems to me that the theories both of a spiritual agent and of associated ideas are as they figure in the psychology books just such metaphysics as this Even if their results be true it would be as well to keep them *as thus presented* out of psychology as it is to keep the results of idealism out of physics

I have therefore treated our passing thoughts as integers and regarded the mere laws of their coexistence with brain states as the ultimate laws for our science The reader will in vain seek for any closed system in the book It is mainly a mass of descriptive details running out into queries which only a metaphysics alive to the weight of her task can hope successfully to deal with That will perhaps be centuries hence and meanwhile the best mark of health that a science can show is this unfinished seeming front

The completion of the book has been so slow that several chapters have been published successively in *Mind* the *Journal of Speculative Philosophy* the *Popular Science Monthly* and *Scribner's Magazine* Acknowledgment is made in the proper places

The bibliography I regret to say is quite unsystematic I have habitually given my authority for special experimental facts but beyond that I have aimed mainly to cite books that would probably be actually used by the ordinary American college student in his collateral reading The bibliography in W Volkmann von Volkmar s *Lehrbuch der Psychologie* (1875) is so complete up to its date that there is no need of an inferior duplicate And for more recent references Sully s *Outlines* Dewey s *Psychology* and Baldwin s *Handbook of Psychology* may be advantageously used

Finally where one owes to so many it seems absurd to single out particular creditors yet I cannot resist the temptation at the end of my first literary venture to record my gratitude for the inspiration I have got from the writings of J S Mill Lotze Renouvier Hodgson and Wundt and from the intellectual companionship (to name only five names) of Chauncey Wright and Charles Peirce in old times and more recently of Stanley Hall James Putnam and Josiah Royce

Harvard University *August* 1890

apoplectic hemorrhage ma have the first effect whilst a very *few* ources of alcohol or grain of opium or ha heesh or a whiff of chloroform or nitrous oxide gas are sure to have the second. The delirium of fever the altered self of insanity are all due to foreign matters circulating through the brain or to pathological ch es in that organ s substance The fact that the brain is the one immedi l operations is indeed so universally admitted pos- of a

proof that the postulate was correct.

Bodily experiences therefore and more particularly brain-experiences must take a place amongst those cond tions of the mental life of which psychology need take account *The spiritualist and the associ nist must both be "cere b alists"* to the extent at least of dmitting that certain peculiarities in the way of working of their own f vorite principles are explicable only by the fact that the brain laws are a codeterminant of the result.

Our first conclusion, then is that a certain amount of brain-physiology must be presupposed or included in psycholo

In still another way the psychologist is forced to be something of a nerve-physiologist. Mental phenomena are not only conditioned *a parte a te* by bod il processes but they lead to them *a parte post* That they lead to *acts* is of course the most familiar of truths but I do not merely mean acts in the sense of voluntary and deliberate muscular performances. Mental states occasion also changes in the calibre of blood vessels or alteration in the heart beats, or processes more subtle still in glands and viscera. If these are taken into account as well as cts which follow at some *remote period* because the mental state was once there it will be safe to lay down the general law that *no mental mod fica ever occurs which is not accompanied or followed by a bodily change* The the ents dis-

cussion, or give advice, or choose a book to read, ould have been the case had they never impressed his retina. Our psychology must therefore take account not only of the conditions antecedent to mental states, but of their resultant consequences as well.

But actions originally prompted by conscious intelligence may grow so automatic by dint of habit as to be apparently unconsciously performed. Standing walking buttoning and unbuttoning, piano-playing talkin even saying one s prayers may be done when the mind is absorbed in other things. The performances of animal *stinct* seem semi- utomatic, and the *reflex acts* of self-preservation certainl are so. Yet they resemble intelligent acts in bringing about the *same ends* at which the animals consciousness on other occasions deliberately aims. Shall the st dy of such machine-like yet purposive acts as these be included in psychology

The boundary line of the mental is certainly vague It is better not to be pedantic, but to let the science be as vague as its subject, and incl de such phenomena as these if by so doing we can throw any light on the main business in hand. It will ere long be seen, I trust, that we can and that we gain much more

Cf George T Ladd *Elements of Physiological Psychology* (1887) pt. iii, chap. iii, §§ 9, 12

ist calls memory an irreducible faculty he says no more than this admission of the associationist already grants

And yet the admission is far from being a satisfactory simplification of the concrete facts For why should this absolute god given faculty retain so much better the events of yesterday than those of last year and best of all those of an hour ago? Why again in old age should its grasp of childhood s events seem firmest? Why should illness and exhaustion enfeeble it? Why should repeating an experience strengthen our recollection of it? Why should drugs fevers asphyxia and excitement resuscitate things long since forgotten? If we content ourselves with merely affirming that the faculty of memory is so peculiarly constituted by nature as to exhibit just these oddities we seem little the better for having invoked it for our explanation becomes as complicated as that of the crude facts with which we started Moreover there is something grotesque and irrational in the supposition that the soul is equipped with elementary powers of such an ingeniously intricate sort Why *should* our memory cling more easily to the near than the remote? Why should it lose its grasp of proper sooner than of abstract names? Such peculiarities seem quite fantastic and might for aught we can see *a priori* be the precise opposites of what they are Evidently then *the faculty does not exist absolutely but works under conditions* and *the quest of the conditions* becomes the psychologist s most interesting task

However firmly he may hold to the soul and her remembering faculty he must acknowledge that she never exerts the latter without a *cue* and that something must always precede and *remind* us of whatever we are to recollect An *idea!* says the associationist an idea associated with the remembered thing *and this explains also why things repeatedly met with are more easily recollected* for their associates on the various occasions furnish so many distinct avenues of recall But this does not explain the effects of fever exhaustion hypnotism old age and the like And in general the pure associationist s ac

For this the associationist must introduce the order of experience in the outer world The dance of the ideas is a copy somewhat mutilated and altered of the order of phenomena But the slightest reflection shows that phenomena have absolutely no power to influence our ideas until they have first impressed our senses and our brain The bare existence of a past fact is no ground for our remembering it Unless we have seen it or somehow *undergone* it we shall never know of its having been The experiences of the body are thus one of the conditions of the faculty of memory being what it is And a very small amount of reflection on facts shows that one part of the body namely the brain *is the part* whose experiences are directly concerned If the nervous communication be cut off between the brain and other parts the experiences of those other parts are non existent for the mind The eye is blind the ear deaf the hand insensible and motionless And conversely *if the brain be injured consciousness* is abolished or altered even although every other organ in the body be ready to play its normal part A blow on the head a sudden subtraction of blood the pressure of an

men to deny that in the physical world final purposes exist at all Loves and desires are to-day no longer imputed to particles of iron or of air No one supposes now that the end of any activity which they may display is an ideal purpose presiding over the activity from its outset and soliciting or drawing it into bein by a sort of *vis a fronte* The end on the contrary is deemed a mere passive result pushed into being *a tergo* havin had so to speak no voice in its own p oduction Alter the pre-existin conditions and with inorganic materi f th each time a different apparent end But with intelli ent

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for the sake of somethin we place it t of it and have a rel on If on the contrary in urveyin its irremediable flux we can think of the present only as so much mere mechanical sprout n from the past occurring with no reference to the future we are atheists and materialists

In the lengthy d scuss ons which p ychologists have carried on about the amount of intell ence d splayed by lower mammals or the amount of consciou ness invol ed in the functions of the nerve-centres of reptiles the same h onl d Is the character of the actions such that we must

mal s on the whole safer under the ci cum sta es i

the act on has a teleol gical character but such mere outward teleology as this mi ht still be the bl nd result of *vis a te go* The growth and movements of pl nts the proce ses of development d estion secretion etc in animals sup-

nervous machinery brings forth under a given irritation *ren ains t t sa t* *the mach nery is alte ed* If to take the stock instance the right knee of a headless frog be ir tated with acid the ri ht foot will wipe it off When however th s foot is amputated the animal w ll often raise the *left* foot to the spot and w pe the offending material away

Pflu er and Lewes reason from such facts in the follow ng way If the first react on were the result of mere machinery they say if that irr tated portion of th skin d scha ged the right leg as a trigger discharges its own barrel of a sh tgun then amputatin the r ht foot would indeed frustrate the wip

by a broad than by a narrow conception of our subject At a certain stage in the development of every science a degree of vagueness is what best consists with fertility On the whole few recent formulas have done more real service of a rough sort in psychology than the Spencerian one that the essence of mental life and of bodily life are one namely the adjustment of inner to outer relations Such a formula is vagueness incarnate but because it takes into account the fact that minds inhabit environments which act on them and on which they in turn react because in short it takes mind in the midst of all its concrete relations it is immensely more fertile than the old fashioned rational psychology which treated the soul as a detached existent sufficient unto itself and assumed to consider only its nature and properties I shall therefore feel free to make any sallies into zoology or into pure nerve physiology which may seem instructive for our purposes but otherwise shall leave those sciences to the physiologists

Can we state more distinctly still the manner in which the mental life seems to intervene between impressions made from without upon the body and reactions *of the body upon the outer world again? Let us look at a few facts*

If some iron filings be sprinkled on a table and a magnet brought near them they will fly through the air for a certain distance and stick to its surface A savage seeing the phenomenon explains it as the result of an attraction or love between the magnet and the filings But let a card cover the poles of the magnet and the filings will press forever against its surface without its ever occurring to them to pass around its sides and thus come into more direct contact with the object of their love Blow bubbles through a tube into the bottom of a pail of water they will rise to the surface and mingle with the air Their action may again be poetically interpreted as due to a longing to recombine with the mother atmosphere above the surface But if you invert a jar full of water over the pail they will rise and remain lodged beneath its bottom shut in from the outer air although a slight deflection from their course at the outset or a re descent towards the rim of the jar when they found their upward course impeded would easily have set them free

meo and Juliet if a wall be built between them do not remain *idiotically press*

reaches the end depends on accidents With the lover it is the end which is fixed the path may be modified indefinitely

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over him he will not like the bubbles perpetually press his nose against its unyielding roof but will restlessly explore the neighborhood until by re descending again he has discovered a path around its brim to the goal of his desires Again the fixed end the varying means!

Such contrasts between living and inanimate performances end by leading

actions but such as are done for an end and show a choice of means can be called i dub table express ons of mind

I hall then adopt this as the criterion b which to circumscribe the subject matter of this work o far as action enters into it Many nervous performances will therefore be unmentioned as being purely physiological Nor will the anatomy of the nervous system and organs of sense be described anew The reader will find in H N Martin s *Human Body* in G T Ladd s *Physiological Psy-* ... standard Anatomies and Physiologies a mass of ... the present work ... ce they directly subserve consciousness, it will be well to g ... nt.

N thing is ea... than t familiarize ... self with the mammalia brain. Get a s eep s ... saw chisel, scalpel and f rceps (all three can best be had from surgical ... man dissecting book, such ... books ... Morrell C mparative Anat

but would not make the *left* leg move It would simply result in the right stump moving through the empty air (which is in fact the phenomenon sometimes observed) The right trigger *makes no effort to discharge the left barrel if the* right one be unloaded nor does an electrical machine ever get restless because it can only emit sparks and not hem pillow cases like a sewing machine

If on the contrary the right leg originally moved for the *purpose* of wiping the acid then nothing is more natural than that when the easiest means of ef fecting that purpose prove fruitless other means should be tried Every failure must keep the animal in a state of disappointment which will lead to all sorts of new trials and devices and tranquillity will not ensue till one of these by a happy stroke achieves the wished for end

In a similar way Goltz ascribes intelligence to the frogs optic lobes and cerebellum We alluded above to the manner in which a sound frog imprisoned in water will discover an outlet to the atmosphere Goltz found that frogs de prived of their cerebral hemispheres would often exhibit a like ingenuity Such a frog after rising from the bottom and finding his farther upward progress checked by the glass bell which has been inverted over him will not persist in butting his nose against the obstacle until dead of suffocation but will often re descend and emerge from under its rim as if not a definite mechanical propul sion upwards but rather a conscious desire to reach the air by hook or crook were the main spring of his activity Goltz concluded from this that the hemi

very different from those excited under normal circumstances by the same an noying position They seem determined consequently not merely by the ante cedent irritant but by the final end—though the irritant of course is what makes the end desired

Another brilliant German author Liebmann[1] argues against the brains *mechanism accounting for mental action by very similar considerations A ma* chine as such he says will bring forth right results when it is in good order and wrong results if out of repair But both kinds of result flow with equally fatal necessity from their conditions We cannot suppose the clockwork whose structure fatally determines it to a certain rate of speed noticing that this

orrect it Its conscience if it

nometer for both alike obey

equally well the same ... *from behind But if the brain* be out of order and the man says Twice four are two instead of Twice four are eight or else I must go to the coal to buy the wharf in stead of I must go to the wharf to buy the coal instantly there arises a con sciousness of error The wrong performance though it obey the same mechani cal law as the right is nevertheless condemned—condemned as contradicting the inner law—the law from in front the purpose or ideal for which the brain *should* act whether it do so or not

We need not discuss here whether these writers in drawing their conclusion have done justice to all the premises involved in the cases they treat of We quote their arguments only to show how they appeal to the principle that *no*

[1] *Zur Analysis der Wirklichkeit* p 489

act ons but such as are done for an end and show a choice of means can be called indubitable expressions of mind

I shall then adopt this as the criterion by which to circumscribe the subject matter of this work so far as action enters into it Many nervous performances will therefore be unmentioned as bein purely physiological Nor will the an

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Chapter II

THE FUNCTIONS OF THE BRAIN

If I begin chopping the foot of a tree its branches are unmoved by my act and *its leaves murmur as peacefully as ever in the wind If on the contrary I do* violence to the foot of a fellow man the rest of his body instantly responds to the aggression by movements of alarm or defence The reason of this difference is that the man has a nervous system whilst the tree has none and the function of the nervous system is to bring each part into harmonious co operation with every other The afferent nerves when excited by some physical irritant be this as gross in its mode of operation as a chopping axe or as subtle as the waves of light conveys the excitement to the nervous centres The commotion set up in the centres does not stop there but discharges itself if at all strong through the efferent nerves into muscles and glands exciting movements of the limbs and viscera or acts of secretion which vary with the animal and with

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circumstance of practical importance the animal s acts are addressed to this circumstance so as to avoid its perils or secure its benefits as the case may be To take a common example if I hear the conductor calling All aboard! as I enter the depot my heart first stops then palpitates and my legs respond to the air waves falling on my tympanum by quickening their movements If I stumble as I run the sensation of falling provokes a movement of the hands towards the direction of the fall the effect of which is to shield the body from too sudden a shock If a cinder enter my eye its lids close forcibly and a copious flow of tears tends to wash it out

These three responses to a sensational stimulus differ however in many re spects The closure of the eye and the lachrymation are quite involuntary and so is the disturbance of the heart Such involuntary responses we know as reflex acts The motion of the arms to break the shock of falling may also be called re *flex since it occurs too quickly to be deliberately intended Whether it be in* stinctive or whether it result from the pedestrian education of childhood may be doubtful it is at any rate less automatic than the previous acts for a man might by conscious effort learn to perform it more skilfully or even to suppress it altogether Actions of this kind into which instinct and volition enter upon equal terms have been called semi reflex The act of running towards the

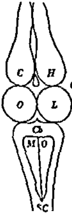
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An outside observer unable to perceive the accompanying consciousness

m _ht be wholly at a loss to discriminate *between the* automatic acts and tho e which volition escorted But if the criterion of mind s existence be the choice of the proper means for the attainment of a supposed end all the acts seem to be
 f r *appropriateness* characterizes them all al ke This
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flexes some such feelin also presides though it may be a feelin of which we remain unconscious Others findin that reflex and semi automatic acts may notwithstandin their appropriateness take place with an unconsciou ness apparently complete fly to the opposite extreme and maintain that the appropriateness even of voluntary actions owes nothin to the fact that con ciou ness
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concei in the organ has been reach which in its main feature seems not unlikely to stand and which even gi es a most plausible scheme of the way in which cerebral and mental operations go hand in hand

The best way to enter the subject will be to take a lower creature like a fro and study by the vivisectional method the functions of his d fferent nerve-centres The frog s nerve-centres are figured in the accompanying d agram which needs no further explanation I will first proceed to state what happens when various amounts of the anterior parts are remo ed in different frogs in the way in which an o dinary student removes them that is with no ex treme precautions as to the purity of the operation We shall in this way reach a very simple conception of the functions of the various centres involving the stron est possible contrast between the cerebral hemispheres and the lower lobes This sharp conception will have didactic ad vantages for it is often very instructive to start with too simple a formula and correct it later on Our first formula as we shall later see will have to be softened down somewhat by the results of more careful experimentation both on frogs and birds and by those of the most recent observations on dogs mon keys and man But it will put us from the outset in clear possess on of some fundamental notions and distinctions which we could otherwise not gain so w ll and none of which the later more completed view will overturn

If then we reduce the frog s nervous system to the spinal cord alone by making a section behind the base of the skull between the spinal cord and the medulla oblongata thereby cutting off the brain from all connection with the rest of the body the frog will still continue to live but with a very peculiarly modified activity It ceases to breathe or swallow it lies flat on its belly and does not like a normal frog sit up on its fore paws though its hind legs are kept as usual folded against its body and immediately resume this position if drawn out If thrown on its back it lies there quietly without turning over like a normal frog Locomotion and voice seem entirely abolished If we suspend it by the nose and irritate different portions of its skin by acid it performs a set of remarkable defensive movements calculated to wipe away the irritant Thus if the breast be touched both fore paws will rub it vigorously if we touch the outer side of the elbow the hind foot of the same side will rise directly to the spot and wipe it The back of the foot will rub the knee if that be attacked whilst if the foot be cut away the stump will make ineffectual movements and then in many frogs a pause will come as if for deliberation succeeded by a rapid passage of the opposite unmutilated foot to the acidulated spot

The most striking character of all these movements after their teleological appropriateness is their precision They vary in sensitive frogs and with a proper amount of irritation so little as almost to resemble in their machinelike regularity the performances of a jumping jack whose legs must twitch whenever you pull the string The spinal cord of the frog thus contains arrangements of cells and fibres fitted to convert skin irritations into movements of defence We may call it the *centre for defensive movements* in this animal We may indeed go farther than this and by cutting the spinal cord in various places find that its separate segments are independent mechanisms for appropriate activities of the head and of the arms and legs respectively The segment governing the arms is especially active in male frogs in the breeding season and these members alone with the breast and back appertaining to them everything else being cut away will then actively grasp a finger placed between them and remain hanging to it for a considerable time

The spinal cord in other animals has analogous powers Even in man it makes movements of defence Paraplegics draw up their legs when tickled and Robin on tickling the breast of a criminal an hour after decapitation saw the arm and hand move towards the spot Of the lower functions of the mammalian cord studied so ably by Goltz and others this is not the place to speak

If in a second animal the cut be made just behind the optic lobes so that the cerebellum and medulla oblongata remain attached to the cord then swallowing breathing crawling and a rather enfeebled jumping and swimming are added to the movements previously observed [1] There are other reflexes too The animal thrown on his back immediately turns over to his belly Placed in a shallow bowl which is *floated on water and made to rotate he responds to the rotation*

— h h – body in the

d so that his

pointed up

[1] It h uld be sa d that this particular cut commonly proves fatal The text refers to the ra e c es wh ch su vive

he pointed to the left etc. But his reactions do not go like frogs whose thalami ut will lide off it to the ground

If the cut be made on another fre between the *thalami and the optic lobes* the locomotion both on land and water becomes quite normal and in addition to the reflexes already shown by the lower centres he croaks regularly when He compensates rotations etc. by move- tilted oss ble to say whether he will avo u

When finally a frog s cerebral hemispheres alone are cut off by a se ion between them and the thalami which preserves the latter an unpractised observer would not at first suspect anything abnormal about the animal Not only is he capable on proper inst gation of all the acts already described but he guides himself by si ht so that if an obstacle be set up between him and the li ht and he be forced to move forward he either jumps over it or swerves to one de He manifests sexual passion at the proper eason and unlike an altogether brainless frog which embraces anything placed between his arms postpones this reflex act until a female of his own pecies is provided Thus far as aforesaid a person unfamiliar with frogs m ght not suspect a mutilation but e en such a person would soon remark the almost entire absence of pontaneous motion—that is motion unprovoked by any *presc t* incitation of sense The continued movements of swimming performed by the creature in the water seem to be the fatal result of the contact of that flu d with its kin. They cease when a stick for example touches his hands This is a en ible irritant towards which the feet are automatically drawn by reflex action and on which the ani mal remains s tting He manifests no hunger and will suffer a fly to crawl over his nose unsnapped at Fear too seems to ha e deserted him In a word he is an extremely complex machine whose actions so far as they go tend to self preser ation but still a *mach ne* in this sense—that it seems to contain no incalcul able element By apply ng the right sensory stimulus to him we are almost as certain of gettin a fixed response as an organist is of hearin a certain tone when he pulls out a certain stop

But now if to the lower centres we add the cerebral hemispheres or if in other words we make an intact animal the ubject of our observations all this is changed In add tion to the previous respon es to present incitements of ense our frog now goes through lon and complex acts of locomot on *sponta eo sly* or as if mo ed by what in ourselves we hould call an idea His reactions to outward stimuli vary the r form too Instead of making simple defensive movements with his hind legs like a headless frog if touched or of giving one or two leaps and then s ttin till like a hemisphe eless one he makes persistent and varied efforts at escape as if not the me e contact of the physiolog t s hand but the notion of dan er suggested by it were now his spur Led by the feeling of hunger too he goes in search of insects fish or smaller frogs and varies his procedure with each species of victim. The physiologist cannot by man pulating him el cut croaking crawling up a board swimming or stoppin at will His conduct has become incalculable We can no lon er foretell it exactly Effort to

escape is his dominant reaction but he *may* do anything else even swell up and become perfectly passive in our hands

Such are the phenomena commonly observed and such the impressions which one naturally receives Certain general conclusions follow irresistibly First of all the following

The acts of all the centres involve the use of the same muscles When a headless frog s hind leg wipes the acid he calls into play all the leg muscles which a frog with his full medulla oblongata and cerebellum uses when he turns from his back to his belly Their contractions are however *combined* differently in the two cases so that the results vary widely We must consequently conclude that specific arrangements of cells and fibres exist in the cord for wiping in the medulla for turning over etc Similarly they exist in the thalami for jumping over seen obstacles and for balancing the moved body in the optic lobes for creeping backwards or what not But in the hemispheres since the presence of *these organs brings no new elementary form of movement* with it but only *determines differently the occasions* on which the movements shall occur making the usual stimuli less fatal and machine like we need suppose no such machinery *directly* co ordinative of muscular contractions to exist We may rather assume when the mandate for a wiping movement is sent forth by the hemispheres that a current goes straight to the wiping arrangement in the spinal cord exciting this arrangement as a whole Similarly if an intact frog wishes to jump over a stone which he sees all he need do is to excite from the hemispheres the jumping centre in the thalami or wherever it may be and the latter will provide for the details of the execution It is like a general ordering a colonel to make a certain movement but not telling him how it shall be done [1]

The same muscle then is repeatedly represented at different heights and at each it enters into a different combination with other muscles to co operate in some special form of concerted movement *At each height the movement is discharged by some particular form of sensorial stimulus* Thus in the cord the skin alone occasions movements in the upper part of the optic lobes the eyes are added in the thalami the semi circular canals would seem to play a part whilst the stimuli which discharge the hemispheres would seem not so much to be elementary sorts of sensation as groups of sensations forming determinate *objects or things* *Prey* is not pursued nor are *enemies* shunned by ordinary hemisphereless frogs Those reactions upon complex circumstances which we call instinctive rather than reflex are already in this animal dependent on the brain s highest lobes and still more is this the case with animals higher in the zoological scale

The results are just the same if instead of a frog we take a pigeon and cut out his hemispheres as they are ordinarily cut out for a lecture room demonstration There is not a movement natural to him which this brainless bird cannot perform if expressly excited thereto only the inner promptings seem deficient and when left to himself he spends most of his time crouched on the ground with his head sunk between his shoulders as if asleep

[1] I confine myself to the frog for simplicity s sake In higher animals especially the ape and man it would seem as if not only determinate combinations of muscles but limited groups or even single muscles could be innervated from the hemispheres

General Notion of Hemispheres

All these facts lead us when we think about them to some such explanatory conception as this *The lower centres act from present sensational stimuli alone the hemisphe es act from perceptions and considerations* the sensations which they may receive serving only as su gesters of these But what are per

n d together? and what are considerations but ex

her ac

rattle-

1 f m considerin nor ua b aterial

mages more or less vivid of the

e of a state of terror a swell

iess etc etc and the ruin of

my hopes But all these ima es a d out of my past experiences They are *reproductions* of what I have felt or witnessed They are in short *remote* sensations and the *difference between the hemisphereless animal and the whole one* may be concisely expressed by savin that the *one obeys absent the other only p esent objects*

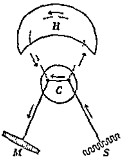
Th h m sph e would then seem to be *the seat of memory* Vestiges of past

roused by

evils and

ng off the

evil a d secur ng the benef ts of the good urrents to electric currents we can compare the nervous system C below the hemis pheres to a direct circuit from sense-organ to muscle along the line S C M of Fig 2 The hemisphere H adds the long circuit or loop-line through which the current may pass when for any reason the direct line is not used



Thus a tired wayfarer on a hot day throws him self on the damp earth beneath a maple-tree The sensations of delicious rest and coolness pouring themsel es through the direct line would naturally d scharge into the muscles of complete extension he would abandon himself to the dangerous repose But the loop-l ne bein open part of the current is drafted

h m

will ask the

ly weigh one motive a a nst another or compare Prude ce in a word is for such a creature an imposs ble virtue Accord ly we see that nature removes those functions in the e ercise of wh ch prudence s a virtue from the lower centres and hands them over to the cerebrum Wherever a creature has to deal with complex

features of the environment prudence is a virtue The higher animals have so to deal and the more complex the features the higher we call the animals The fewer of his acts then can *such* an animal perform without the help of the organs in question In the frog many acts devolve wholly on the lower centres in the bird fewer in the rodent fewer still in the dog very few indeed and in apes and men hardly any at all

The advantages of this are obvious Take the prehension of food as an example and suppose it to be a reflex performance of the lower centres The animal will be condemned fatally and irresistibly to snap at it whenever presented no matter what the circumstances may be he can no more disobey this prompting than water can refuse to boil when a fire is kindled under the pot His life will again and again pay the forfeit of his gluttony Exposure to retaliation to other enemies to traps to poisons to the dangers of repletion must be regular parts of his existence His lack of all thought by which to weigh the danger against the attractiveness of the bait and of all volition to remain hungry a little while longer is the direct measure of his lowness in the mental scale And those fishes which like our cunners and sculpins are no sooner thrown back from the hook into the water than they automatically seize the hook again would soon expiate the degradation of their intelligence by the extinction of their type did not their exaggerated fecundity atone for their imprudence

though left on a cornheap

Take again the sexual function In birds this devolves exclusively upon the hemispheres When these are shorn away the pigeon pays no attention to the billings and cooings of its mate And Goltz found that a bitch in heat would excite no emotion in male dogs who had suffered large loss of cerebral tissue Those who have read Darwin s *Descent of Man* know what immense importance in the amelioration of the breed in birds this author ascribes to the mere fact of sexual selection The sexual act is not performed until every condition of circumstance and sentiment is fulfilled until time place and partner all are fit But in frogs and toads this passion devolves on the lower centres They show consequently a machine-like obedience to the present incitement of sense and an almost total exclusion of the power of choice Copulation occurs *per fas aut nefas* occasionally between males often with dead females in puddles exposed on the highway and the male may be cut in two without letting go his hold Every spring an immense sacrifice of batrachian life takes place from these causes alone

No one need be told how dependent all human social elevation is upon the prevalence of chastity Hardly any factor measures more than this the difference between civilization and barbarism Physiologically interpreted chastity means nothing more than the fact that present solicitations of sense are overpowered by suggestions of æsthetic and moral fitness which the circumstances awaken in the cerebrum and that upon the inhibitory or permissive influence of *these alone action directly depends*

Within the psychic life due to the cerebrum itself the same general distinction obtains between considerations of the more immediate and considerations

of the more remote In all a es the man whose determinations are swayed by reference to the most distant ends has been held to possess the highest intelligence The tramp who lives from hour to hour the bohemian whose engagements are from day to day the bachelor who builds but for a single life the father who acts for another generation the patriot who thinks of a whole community and many generations and finally the philosopher and saint whose [illegible] ternity —these range themselves in an un- [illegible] creased man- [illegible] entres are dis-

In the loop-line [illegible] listant are supposed to lie the action so far as it is a physical process [illegible] be interpreted after the type of the action in the lower centres. If regarded here as a reflex process it must be reflex there as well The current in both places runs out into the muscles only after it has first run in but whilst the path by which it runs out is determined in the lower centres by reflections few and fixed amongst the cell arrangements in the hemispheres the reflections are many and instable This it will be seen is only a difference of degree and not of kind and does not change the reflex type. The conception of *all* action as conforming to this type is the fundamental conception of modern nerve-physiology So much for our general preliminary conception of the nerve-centres! Let us define it more distinctly before we see how well physiological observation will bear it out in detail

The Education of the Hemispheres

Nerve-currents run in through sense-organs and whilst provoking reflex acts in the lower centres, they arouse ideas in the hemispheres which either permit the reflexes in question check them or substitute others for them All ideas being in the last resort reminiscences the question to answer is *How can processes become orga[n]ized in the hemispheres which correspond to reminiscences in the mind?*

Nothing is easier than to conceive a *possible* way in which this might be done provided four assumptions be granted. These assumptions (which after all are inevitable in any event) are

1) The same cerebral process which when aroused from without by a sense-organ gives the perception of an object will give an *idea* of the same object when aroused by other cerebral processes from within.

2) If processes 1 2 3 4 have once been aroused together or in immediate

I hope that the reader will take [illegible] umbrage at my so mixing the physical and mental and talking of reflex [a]cts and hemispheres and reminiscences in the same breath as if they were homogeneous quantities and factors of [illegible] causal chain. I have d[one] so deliberately f[or] alth[ou]gh I admit that from the radically physical point of view it is easy to conceive of the chain of events amongst the cells and fibres as complete in itself and that whilst conceiving it one need make no mention of "ideas" I yet suspect that point of view of being an unreal abstraction. Reflexes in [the] centres may take place even where accompanying feelings [or] ideas guide them. I[n] an[o]ther chapt[er] I shall try to show reasons f[or] [illegible] t [illegible] ban- d[o]n[i]ng this common-sense position meanwhile language lends itself so much more easily to the mixed way of describing that I will continue to employ the latter The more radical minded reader can always read ideational process for "idea.

succession any subsequent arousal of any one of them (whether from without or within) will tend to arouse the others in the original order [This is the so-called law of association]

3) Every sensorial excitement propagated to a lower centre tends to spread upwards and arouse an idea

4) Every idea tends ultimately either to produce a movement or to check one which otherwise would be produced

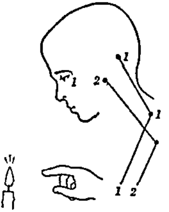


FIG 3

Suppose now (these assumptions being granted) that we have a baby before us who sees a candle-flame for the first time and by virtue of a reflex tendency common in babies of a certain age extends his hand to grasp it so that his fingers get burned So far we have two reflex currents in play first from the eye to the extension movement along the line $1—1—1—1$ of Fig 3 and second from the finger to the movement of drawing back the hand along the line $2—2—$ — If this were the baby s whole nervous system and if the reflexes were once for all organic we should have no alteration in his behavior no matter how often the experience recurred The retinal image of the flame would always make the arm shoot forward the burning of the finger would always send it back But we know that the burnt child dreads the fire and that one experience usually protects the fingers forever The point is to see how the hemispheres may bring this result to pass

We must complicate our diagram (see Fig 4) Let the current $1—1$ from *the eye discharge upward as well as downward when it reaches the lower centre* for vision and arouse the perceptional process s^1 in the hemispheres let the feeling of the arm s extension also send up a current which leaves a trace of itself m^1 let the burnt finger leave an analogous trace s^2 and let the movement of retraction leave m^2 These four processes will now by virtue of a sumption 2) be associated together by the path $s^1—m^1—s^2—m^2$ running from the first to the last so that if anything touches off s^1 ideas of the extension of the burnt finger and of the retraction will pass in rapid succession through the mind The effect on the child s conduct when the candle flame is next presented is easy to imagine Of course the sight of it arouses the grasping reflex but it arouses simultaneously the idea thereof together with that of the consequent pain and of the final retraction of the hand and if these cerebral processes prevail in strength over the immediate sensation in the centres below the last idea will be the cue by which the final action is discharged The grasping will be arrested in mid career the hand drawn back and the child s fingers saved

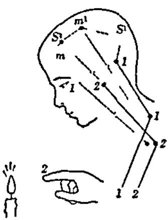


FIG 4 The dotted lines stand for afferent paths the broken lines for paths between the centres the entire lines for efferent paths

In all this we assume that the hemispheres do not *natively* couple any particular sense-impression with any special motor discharge They only register and preserve traces of such couplings as are already organized in the reflex centres below But this brings it inevitably about that when a chain of experiences has been already registered and the first link is impressed once again ... will often be awakened in *idea* long before it can exist ... hat motion ... the actual ... *ion* of fu-
impression to arise Thus an animal ... ture things or to use our previous formula he acts from considerations of distant good and ill If we give the name of *p rtrers* to the original couplings of impressions with mot ons in a reflex way then we may say that the function of the hemispheres is mpl to brin about *excha ges among the partners* Movement *m* which nativel is *sensation s* s partner becomes throu h the hemisphe es the partner of ensat on *s* s^2 *or* s^3 It is like the great commutating ... tation No new elementary process is in ... any ... d an ... art. ... eral ... but
clear in detail The brain phys ology of late years ... ught to work out the paths by which these couplings of ensations with movements take place both in the hemispheres and in the centres below

So we must next test our scheme by the facts discovered in this direction We hall conclude I think after taking them all into account that the scheme probably makes the lower centres too machine-like and the hemispheres not quite machine-like enou h and must consequently be softened down a little So much I may say in advance Meanwhile before plungin into the details which await u it will somewhat clear our ideas if we contrast the modern way of looking at the matter with the *phrenolo ical* conception which but lately preceded it.

The Phrenolo ical Conception

In a certain sense Gall was the first to seek to explain in detail how the brain could subserve our mental operations His way of proceedin was only too simple He took the faculty psychology as his ultimatum on the mental side and he made no farther psychological analysis Wherever he found an individual with some strongl marked trait of character he examined his head and if he found the latter prominent in a certain region he said without more ad that that region was the organ of the trait or faculty in question The

I hall call it h reaft f sh rtness "th Meynert schem f th child and flame example as well as th wh le general ... that th h mispheres are supernumerary surface f h projecti and associatio f sensati ns and m vements natively coupled in th centres bel w is due t Theod M ynert th Austrian anat mist. F popular ac t f his iews se his pamphlet *Zur M ... d G hirnba* Vienna 874 His m t recent devel pment f them is mbodied in his *P ... y* clinical treatise ... dis ases f the f rebrain, translated by B S chs N w Y k, 885

traits were of very diverse constitution some being simple sensibilities like weight or color some being instinctive tendencies like alimentiveness or amativeness and others again being complex resultants like conscientiousness individuality Phrenology fell promptly into disrepute among scientific men because observation seemed to show that large faculties and large bumps might fail to coexist because the scheme of Gall was so vast as hardly to admit of accurate determination at all—who of us can say even of his own brothers whether their perceptions of *weight* and of *time* are well developed or not?—because the followers of Gall and Spurzheim were unable to reform these errors in any appreciable degree and finally because the whole analysis of faculties was vague and erroneous from a psychologic point of view Popular professors of the lore have nevertheless continued to command the admiration of popular audiences and there seems no doubt that phrenology however little it satisfy our scientific curiosity about the functions of different portions of the brain may still be in the hands of intelligent practitioners a useful help in the art of reading character A hooked nose and a firm jaw are usually signs of practical energy soft delicate hands are signs of refined sensibility Even so may a prominent eye be a sign of power over language and a bull neck a sign of sensuality But the brain behind the eye and neck need no more be the *organ* of the signified faculty than the jaw is the organ of the will or the hand the organ of refinement These correlations between mind and body are however so frequent that the characters given by phrenologists are often remarkable for knowingness and insight

Phrenology hardly does more than restate the problem To answer the question Why *do* I like children? by saying Because you have a large organ of philoprogenitiveness but renames the phenomenon to be explained What *is* my philoprogenitiveness? Of what mental elements does it consist? And how *can* a part of the brain be its organ? A science of the mind must reduce such complex manifestations as philoprogenitiveness to their *elements* A science of the brain must point out the functions of *its* elements A science of the relations of mind and brain must show how the elementary ingredients of the former correspond to the elementary functions of the latter But phrenology except by occasional coincidence takes no account of elements at all Its faculties as a rule are fully equipped persons in a particular mental attitude Take for example the faculty of language It involves in reality a host of distinct powers We must first have images of concrete things and ideas of abstract qualities and relations we must next have the memory of words and then the capacity so to associate each idea or image with a particular word that when the word is heard the idea shall forthwith enter our mind We must conversely as soon as the idea arises in our mind associate with it a mental image of the word and by means of this image we must innervate our articulatory apparatus so as to reproduce the word as physical sound To read or to write a language other elements still must be introduced But it is plain that the faculty of spoken language alone is so complicated as to call into play almost all the elementary powers which the mind possesses memory imagination association judgment and volition A portion of the brain competent to be the adequate seat of such a faculty would needs be an entire brain in miniature —just as the faculty itself is really a specification of the entire man a sort of homunculus

Yet just such homunculi are for the most part the phrenological organs As Lan e says

We ha e a pa liament of little men together each one of whom as happens also in a real p rl ament possesses but a single idea which he ceaselessly strives to make p e ail [benevolen e firmness h pe and the rest] Instead of one soul phrenology ch alo e as enigmatic as the full aggregate psychic life can be In des it into personal be n s orse inside called out the rs in explaining to them the e erything becomes clear e itself calls for no explana t view of the ghost l ke soul entity but she ends by populating u osts of the same order [1]

Modern Science conceives of the matter in a very different way *Brain and mi d alike consist of simple elements sensory and motor* All nervous cen tres says Dr Hu hlings Jackson from the lowest to the very highest (the substrata of consciousness) are made up of nothin else than nervous arrange*ments representing impress ons and movements* I do not see of what other materials the brain *can* be made Meynert represents the matter similarly when he calls the cortex of the hemispheres the surface of projection for e ery muscle and every sensitive point of the body The muscles and the sensi h h it

chology There is a complete parallelism bet een the two diagram of l ttle dots circles or triangles joined by lines symbol zes equally well the cerebral and mental processes the dots stand for cells or ideas the l nes for fibres or assoc ations We shall have later to critici e this analysis so far as t relates to the mind but there is no doubt that it is a most convenient and has been a most useful hypothesis formulating the facts in an extremely natur l way

to which sensational surface of projection and which motor idea to which

l on quest on

The Locali ation of Functions in the Hemispheres

Up to 1870 the opinion wh ch prevailed was that which the experiments of Flourens on pi eons brains had made plaus ble namely that the different

G k kt d M t nals m d d II p 345
B l *Riding A yl m R p t* 876 p 67

functions of the hemispheres were not locally separated but carried on each by the aid of the whole organ Hitzig in 1870 showed however that in a dogs brain highly specialized movements could be produced by electric irritation of determinate regions of the cortex and Ferrier and Munk half a dozen years later seemed to prove either by irritations or excisions or both that there were equally determinate regions connected with the senses of sight touch hearing and smell Munks special sensorial localizations however disagreed with Ferriers and Goltz from his extirpation experiments came to a conclusion adverse to strict localization of any kind The controversy is not yet over I will not pretend to say anything more of it historically but give a brief account of the condition in which matters at present stand

The one thing which is *perfectly* well established is this that the central convolutions on either side of the fissure of Rolando and (at least in the monkey) the calloso marginal convolution (which is continuous with them on the mesial surface where one hemisphere is applied against the other) form *the region by which all the motor incitations which leave the cortex pass out* on their way to those executive centres in the region of the pons medulla and spinal cord from which the muscular contractions are discharged in the last resort The existence of this so called motor zone is established by the lines of evidence successively given below

(1) *Cortical irritations* Electrical currents of small intensity applied to the surface of the said convolutions in dogs monkeys and other animals produce well defined movements in face fore limb hind limb tail or trunk according as one point or another of the surface is irritated These movements affect almost invariably the side opposite to the brain irritations If the left hemisphere be excited the movement is of the right leg side of face etc All the objections at first raised against the validity of these experiments have been overcome The movements are certainly not due to irritations of the base of the brain by the downward spread of the current for *a*) mechanical irritations will produce them though less easily than electrical *b*) shifting the electrodes to a point close by on the surface changes the movement in ways quite inexplicable by changed physical conduction of the current *c*) if the cortical centre for a certain movement be cut under with a sharp knife but left *in situ* although the electric conductivity is physically unaltered by the operation the physiological conductivity is gone and currents of the same strength no longer produce the movements which they did *d*) the time inter

[illegible] n of [illegible] lectric stimulus to the cortex and the re-

[illegible] e if the cortex acted physiologically and

[illegible] the irritation It is namely a well known fact that when a nerve current has to pass through the spinal cord to excite a muscle by reflex action the time is longer than if it passes directly down the motor nerve the cells of the cord take a certain time to discharge Similarly when a stimulus is applied directly to the cortex the muscle contracts two or three hundredths of a second later than it does when the place on the cortex is cut away and the electrodes are applied to the white fibres below[1]

[1] For a thorough di[illegible]cu[illegible]sion of the [illegible]ar[illegible]us obj[illegible]ct[illegible]n [illegible] Fe[illegible]r[illegible]rs *F[illegible]ct[illegible]s of the Bra[illegible]* second ed pp 227 34 and Franço[illegible] Franck s *Leço[illegible]s [illegible] du cerveau* (1887) *leçon* 31 The mo[illegible]t m[illegible]ut[illegible]ly ac[illegible]u[illegible]t[illegible]e[illegible] pe[illegible]iments [illegible]n irrit[illegible]u[illegible]n of cortical

(2) *Cortical ablatio s* When the cortical spot which is found to produce a movement of the fore leg in a do is excised (see pot 5 in Fig 5) the leg in question becomes peculiarly affected At first it seems paralyzed Soon how ever it is used with the other le s but badly The animal does not bear his

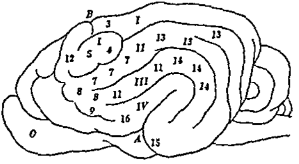


Fig 5 L ft h m ph f d g brai ft F *A* th fiss e f Syl s *B* th cruci l f *O* th lf t ry b lb *I II III IV* indicat th first d third and *f* th t rn f f tio s re p ti ely ( ) (4) d (5) th *s gmo d* gyrus

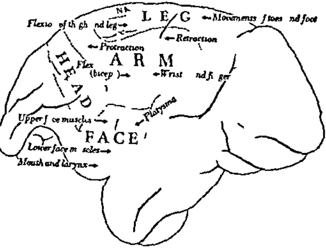


Fig 6 L ft h m ph f m k y bra O t f ce

out when running on a smooth surface or when shaking himself etc etc Sensi

p ints ar th se f Pan th m *Pfl g r A h* l. 37 p 5 8—R ently th sk ll h been

bility of all kinds seems diminished as well as motility, but of this I shall speak later on Moreover the dog tends in voluntary movements to swerve towards the side of the brain lesion instead of going straight forward All these symptoms gradually decrease so that even with a very severe brain lesion the dog may be outwardly indistinguishable from a well dog after eight or ten weeks Still a slight chloroformization will reproduce the disturbances even then

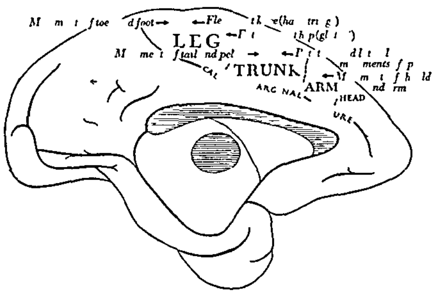


FIG 7 Left hemisphere of monkey s brain Mesial surface

alysis *The strength of whatever movements are made is as great as ever*— dogs with extensive destruction of the motor zone can jump as high and bite as hard as ever they did but they seem *less easily moved* to do *anything* with the affected parts Dr Loeb who has studied the motor disturbances of dogs more carefully than any one conceives of them *en masse* as effects of an in

Even when the entire motor zone of a dog is removed there is no permanent paralysis of any part but only this curious sort of relative inertia when the two sides of the body are compared and this itself becomes hardly noticeable after a number of weeks have elapsed Prof Goltz has described a dog whose entire left hemisphere was destroyed and who retained only a slight motor inertia on the right half of the body In particular he could use his right paw for hold

whether that faculty also came back *His tactile sensibility* w
diminished on the right side [2] In *monkeys* a genuine paralysis follows upon ab

[1] J Loeb *Beitrage zur Physiologie des G ossh rns* in *Pfl ger's Archiv* xxxix, p 293 I simplify the author s statem nt [2] *Goltz* in *Pfl ger's Arch* xlii p 419

latio..s of the cortex in the motor region. This paralysis affects parts of the body which vary with the brain parts removed The monkey s opposite arm or leg ha..gs flaccid or at most takes a small part in associated movements. When the entire region is removed there is a genuine and permanent hemiplegia in which the arm is more affected th..n the leg and this is followed months later by con tracture of the muscles, as in man after inveterate hemiplegia According to Schaefer and Horsley the trunk muscles also become paralyzed after destruc tion of the *marginal* convolution on *both* sides (see Fig 7) These differences between dogs and monkeys show the dan er of drawing general conclusions

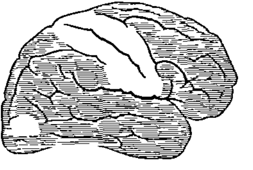


Fig 8 Right hemis here f h ma brain. Lateral surf ce.

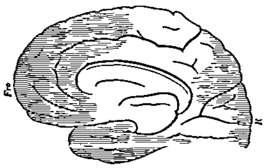


Fig 9 Right h misphere f human brai Mesial urf ce

from experiments done on any one sort of animal I subjoin the figures given by the last named authors of the moto regions in the monkey s brain

In man we are necessarily reduced to the observation *pos mortem* of cortical ablations produced by accident or disease (tumor hemorrh..ge softenin etc.) What results during l fe from uch conditions is either localized spasm or palsy of certain muscles of the opposite ide Th cortical regions which in variably produce these results are homologous with those which we have just been tudyin n the do cat ape etc. Figs 8 and 9 show the result of 169 cases carefully studied b Exn r The parts shaded are regions where lesions

H miplegia means one-sided palsy
Ph ph.cal T ct ons vol. 79 pp 6, 1 (588) In later paper (bid p. 5) Messrs Bee and H rsley g int th localizati still m re minutely howing spots from hich zl muscles ingl digits can be made to c tract.

produced *no* motor disturbance Those left white were on the contrary never injured without motor disturbances of some sort Where the injury to the cortical substance is profound in man the paralysis is permanent and is succeeded by muscular rigidity in the paralyzed parts just as it may be in the monkey

(3) *Descending degenerations* show the intimate connection of the rolandic regions of the cortex with the motor tracts of the cord When either in man or in the lower animals these regions are destroyed a peculiar degenerative

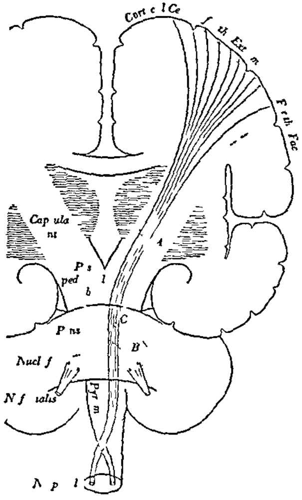


FIG 10 Sch mat c transver e ect on of brain showing motor strand—After Ed nger

change known as secondary sclerosis is found to extend downwards through the white fibrous substance of the brain in a perfectly d f

into the anterior (direct) and lateral (crossed) columns of the spinal cord

(4) *Anatomical proof* of the continuity of the rolandic regions with these motor columns of the cord is also clearly given Flechsig's *Pyramidenbahn* forms an uninterrupted strand (distinctly traceable in human embryos be

fibres ha e acquired the r white medullar heath) passing upwards
nd tr ersin the internal capsule and

fibrous strand It passes directly
the cord dependin for its proper nutrition (as the facts of de en
show) on the influence of the cortical cells just as motor nerves depend for
their nutrition on that of the cells of the spinal cord Electrical stimulation of

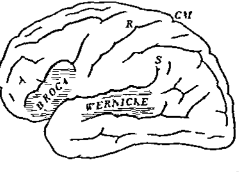


Fig Sch mat p f f l lt h misph re w th th pa t had d wh se
destr ti ca se m t (B ca) d sensory (W rni k) phasia ( )

this motor strand in any accessible part of its course has been hown in dogs to produce movements analogous to those which excitement of the cortical surface calls forth

One of the most instructive proofs of motor localization in the cortex is that furni hed by the disease now called aphemia or *motor aphasia* Motor aphasia is neither loss of voice nor paralysis of the tongue or l ps The patient s voice is as stron as ever and all the innervations of his hypo lossal and facial nerves except those necessary for speakin may go on perfectly well He can laugh and cry and e en ing but he either is unable to utter any words at all or a few meanin less stock phrases form his only speech or else he speaks incoherently and confusedly mi p onouncin misplacin and misusing his wo ds in various degrees Sometimes his peech is a mere broth of unintelli ible syllables *In cases of pure motor aphas a the patient recognizes his mistakes* and suffers acutely from them Now whenever a pat ent d es in such a condition as this and an examination of his brain is perm tted it is found that the lowest frontal gyrus (ee Fig 11) is the eat of injury Broca first noticed this fact in 1861 and ince then the gyrus has gone by the name of Broca s convolution The injury in right handed people is found on the left hemisphere and in left handed people on the right hemisphere Most people *in fact* are left brained that is all their delicate and specialized movements are handed over to the charge of the left hemisphere The ordinary right handedness for such movements is only a consequence of that fact a consequence which shows outwardly on accou t of that e tensive decussation of the fibres whereby most of those f om the left hemisphere pass to the ri ht half of the body only But the l ft bra nedness might exist in equal measure and not show outwardly

produced *no* motor disturbance Those left white were on the contrary never injured without motor disturbances of some sort Where the injury to the cortical substance is profound in man the paralysis is permanent and ... by muscular rigidity in the p...

(3) *Descending degenera...*
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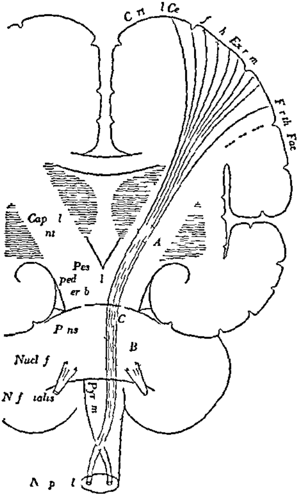
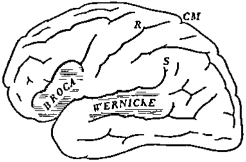


FIG 10 Schemat c tran ve e ecti n of brain showing motor st and —After Ed nger

change known as secondary sclerosis is found to extend downwards through the white fibrous substance of the brain in a perfectly definite manne... certain distinct strands ... into the anterior pyrami... crossing to the other si... ... o the anterior (direct) and lateral (crossed) columns of the spinal cord

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a h wh t medullarv heath) passing upwards in the internal capsule and Fi 10) None of the inferior onnection with this important fibrous strand It passes d rectly from the cortex to the motor arrangements in the cord depending for its proper nutrition (as the facts of degeneration show) on the influence of the cortical cells just as motor nerves depend for their nutrition on that of the cells of the spinal cord Electrical stimulation of



Fi S h m ti p f f l ft h m sph w th th p (h ded wh d tr ti ca se m t (B ca) d se s ry (W rn ke) ph a. ( )

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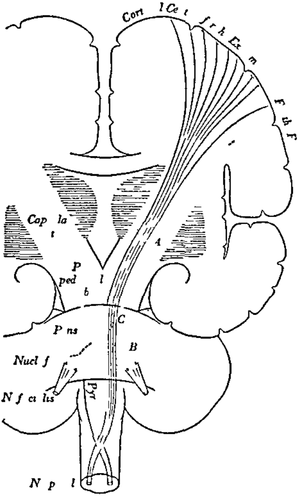


FIG 10 Schematic transverse section of brain showing motor strand —After Edinger

change known as secondary sclerosis is found to extend downwards through the white fibrous substance of the brain in a perfectly definite manner affecting

– ule crura and pons
from thence (partly
(direct) and lateral

(crossed) columns of the spinal cord

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Sight

Ferrier was the first in the field here. He found, when the *angular* convolution (that lying between the "intra-parietal" and "external occipital" fissures, and bending round the top of the fissure of Sylvius, in Fig. 6) was excited in the monkey, that movements of the eyes and head as if for vision occurred; and that when it was extirpated, what he supposed to be total and permanent blindness of the opposite eye followed. Munk almost immediately declared total and permanent blindness to follow from destruction of the *occipital lobe* in monkeys as well as dogs, and said that the angular gyrus had nothing to do with sight, but was only the centre for tactile sensibility of the eyeball. Munk's absolute tone about his observations and his theoretic arrogance have led to his ruin as an authority. But he did two things of permanent value. He was the first to distinguish in these vivisections between sensorial and *psychic* blindness, and to describe the phenomenon of *restitution* of the visual function after its first impairment by an operation; and the first to notice the *hemiopic* character of the visual disturbances which result when only one hemisphere is injured. Sensorial blindness is absolute insensibility to light; psychic blindness is inability to recognize the *meaning* of the optical impressions, as when we see a page of Chinese print but it suggests nothing to us. A hemiopic disturbance of vision is one in which neither retina is affected in its totality, but in which, for example, the left portion of *each* retina is blind, so that the animal sees nothing situated towards its right. Later observations have corroborated this hemiopic character of all the disturbances of sight from injury to a single hemisphere in the higher animals; and the question whether an animal's apparent blindness is sensorial or only psychic has, since Munk's first publication, been the most urgent one to answer in all observations relative to the function of sight.

Goltz almost simultaneously with Ferrier and Munk reported experiments which led him to deny that the visual function was essentially bound up with any one localized portion of the hemispheres. Other divergent results soon came in from many quarters, so that without going into the history of the matter[1] any more I may report the existing state of the case as follows:

In *fishes, frogs* and *lizards* vision persists when the hemispheres are entirely removed. This is admitted for frogs and fishes even by Munk, who denies it for birds.

All of Munk's *birds* seemed totally blind (blind sensorially) after removal of both hemispheres by his operation. The following of a candle by the head and winking at a threatened blow, which are ordinarily held to prove the retention of optical sensations by the lower centres in supposed hemisphereless pigeons, are by Munk ascribed to vestiges of the visual sphere of the cortex left behind by the imperfection of the operation. But Schrader, who operated after Munk and with every apparent guarantee of completeness, found that all his pigeons saw after two or three weeks had elapsed, and the inhibitions resulting from the wound had passed away. They invariably avoided even the

[1] The history up to [illegible] found in A. Christiani: *Zur Physiologie des Gehirnes* [illegible]

This would happen wherever organs on *both* sides of the body could be gov erned by the left hemisphere and just such a case seems offered by the vocal organs in that highly delicate and special motor service which we call speech Either hemisphere *can* innervate them bilaterally just as either seems able to innervate bilaterally the muscles of the trunk ribs and diaphragm Of the special movements of speech however it would appear (from the facts of aphasia) that the left hemisphere in most persons habitually takes exclusive charge With that hemisphere thrown out of gear speech is undone even though the opposite hemisphere still be there for the performance of less specialized acts such as the various movements required in eating

It will be noticed that Broca s region is homologous with the parts ascer tained to produce movements of the lips tongue and larynx when excited by electric currents in apes (cf Fig 6 p 21) The evidence is therefore as com plete as it well can be that the motor incitations to these organs leave the brain by the lower frontal region

Victims of motor aphasia generally have other disorders One which inter ests us in this connection has been called *agraphia* they have lost the power to *write* They can read writing and understand it but either cannot use the pen at all or make egregious mistakes with it The seat of the lesion here is less well determined owing to an insufficient number of good cases to conclude from [1] There is no doubt however that it is (in right handed people) on the left side and little doubt that it consists of elements of the hand and arm region specialized for that service The symptom may exist when there is little or no disability in the hand for other uses If it does not get well the patient usually educates his right hemisphere i e learns to write with his left hand In other cases of which we shall say more a few pages later on the patient can write both spontaneously and at dictation but cannot read even what he has himself written! All these phenomena are now quite clearly explained by separate brain centres for the various feelings and movements and tracts for associating these together But their minute discussion belongs to medicine rather than to general psychology and I can only use them here to illustrate the principles of motor localization [2] Under the heads of sight and hearing I shall have a little more to say

The different lines of proof which I have taken up establish conclusively the proposition that *all the motor impulses which leave the cortex pass out* in healthy animals *from the convolutions about the fissure of Rolando*

When however it comes to defining precisely what is involved in a motor impulse leaving the cortex things grow more obscure Does the impulse start independently from the convolutions in question or does it start elsewhere and merely flow through? And to what particular phase of psychic activity does the activity of these centres correspond? Opinions and authorities here divide but it will be better before entering into these deeper aspects of the problem to cast a glance at the facts which have been made out concerning the relations of the cortex to sight hearing and smell

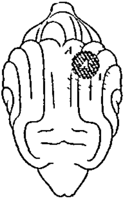
[1] Nothnagel und Nau yn *D e Loc l t on den Geh rnkr kl eite* (Wiesb den 1887) p 34

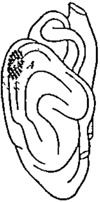
[2] An access ble account of the h t ry of u knowl dg of motor apha a s in W A H mmond s *Treatise on tl Diseases of the Nerv s System* chap vii

d mness of vision (hemiambl} opia) in which (howe\ er se\ ere) the centres remain the best seeing portions of the retina just as they are in normal dogs The lateral or temporal part of each retina seems to be in exclusive con nection with the cortex of its own side The centre and nasal part of each seems on the contrary to be connected with the cortex of the opposite hemi spheres Loeb who takes broader views than any one conceives the hemiam

on wh chever side it be

When both occipital lobes are extensively destroyed total blindness may result Munk maps out his *Schspha e* definitely and says that blindness *must* re sult when the entire shaded part marked *A A* in Fi s 12 and 13 is involved





F G

F 3

in the lesion. Discrepant reports of other observations he explains as due to i complete ablation Luciani Goltz and Lannegrace however contend that they have made complete bilateral extirpations of Munk s *Sehsphare* more than once a d found a sort of crude indiscriminating sight of objects to return in a few weeks The ni est wh her

L ciani und Sepp'li *D Fun tion Locali t on auf der G h rnri d* (D ts h n Fraenk l) Leipzig 886 D gs M N d S G lt *Pfl ger' A hiv* v l. 34 pp 490–96 vol 4 p 454 *Cf* lso Munk Be li Academy *S i g bericht* 1886 'II, 'III pp. 3 21, and Loeb, in *Pfl ger' A hiv* vol. 39 p 337

slightest obstacles flew very regularly towards certain perches etc differing *toto cælo in these respects with certain simply blinded* pigeons who were kept with them for comparison They did not pick up food strewn on the ground however Schrader found that they would do this if even a small part of the frontal region of the hemispheres was left and ascribes their non self feeding when deprived of their occipital cerebrum not to a visual but to a motor defect a sort of alimentary aphasia [1]

In presence of such discord as that between Munk and his opponents one must carefully note how differently significant is *loss* from *preservation* of a function after an operation on the brain The *loss* of the function does not necessarily show that it *is* dependent on the part cut out but its *preservation* does show that it is *not* dependent and this is true though the loss should be observed ninety nine times and the preservation only once in a hundred similar excisions That birds and mammals *can* be blinded by cortical ablation is undoubted the only question is *must* they be so? Only then can the cortex be certainly called the seat of sight The blindness may always be due to one of those remote effects of the wound on distant parts inhibitions extensions of inflammation —interferences in a word —upon which Brown Sequard and Goltz have rightly insisted and the importance of which becomes more manifest every day Such effects are transient whereas the *symptoms of deprivation* (*Ausfallserscheinungen* as Goltz calls them) which come from the actual loss of the cut out region must from the nature of the case be permanent Blindness in the pigeons *so far as it passes away* cannot possibly be charged *to their seat of vision being lost but only to some influence which temporarily* depresses the activity of that seat The same is true *mutatis mutandis* of all the other effects of operations and as we pass to mammals we shall see still more the importance of the remark

In rabbits loss of the entire cortex seems compatible with the preservation of enough sight to guide the poor animals movements and enable them to avoid obstacles Christiani s observations and discussions seem conclusively to have established this although Munk found that all *his* animals were made totally blind [2]

In dogs also Munk found absolute stone blindness after ablation of the occipital lobes He went farther and mapped out determinate portions of the cortex thereupon which he considered correlated with definite segments of the two retinæ so that destruction of given portions of the cortex produces blindness of the retinal centre top bottom or right or left side of the same or opposite eye There seems little doubt that this definite correlation is mythological Other observers Hitzig Goltz Luciani Loeb Exner etc find whatever part of the cortex may be ablated on one side that there usually results a *hemiopic* disturbance of *both* eyes slight and transient when the anterior lobes are the parts attacked grave when an occipital lobe is the seat of injury and lasting in proportion to the latter s extent *According to Loeb the defect is a*

[1] *Pflüger's Archiv* vol 44 p 176 Munk (Berlin Academy *Sitzungsberichte* 1889 xxxi) returns to the charge denying the extirpations of Schrader to be complete Most ... portions of the *Sehsphäre* must remain

[2] A Christiani *Zur Physiol d Gehirnes* (Berlin 1885) chaps ii iii iv H Munk Berlin Academy *Sitzungsberichte* 1884 xxiv

to have extirpated the entire lobes When one lobe only is injured the affection of sight is hemiopic in monkeys in this all observers agree On the whole then Munk s original location of vision in the occipital lobes is confirmed by the later evidence

— ... ...ct results since we are not driven to interpret the ... w cannot viv... ...ologists who ...lude that the ...iopic disturb... ...otal blindness

...ally the nei h... boring angular and supra-marginal ... ...pany extensive injury in the motor region of the cortex In these cases it seems probable that it is due to an *actio in d stans* probably to the interruption of fibres proceeding from the occipital lobe There eem to be a few cases on record where there was injury to the occip tal lobes without visual defect. Ferrier has collected as many as possible to prove his localization in the angular gyrus A strict appli cation of logical principles would make one of these cases outwei h one hun... ...others ... how imperfect observations may ... be rash for their ... ce for the occipital ... n of an anomalous case There is no more prominent ... ... it of the decussa tion of the pyram ds nor any more usual pathological fact than its conse quence that left handed hemorrha es into the motor region produce right handed paralyses And yet the decussation is variable in amount and seems sometimes to be ab ent alto ether If in such a case as this last the left brain were to become the seat of apoplexy the left and not the right half of the body would be the one to suffer paralysis

The *schema* on page 32 copied from Dr Seguin expresses on the whole the probable truth about the regions concerned in vision Not the entire oc cipital lobes but the so-called cune and the first convolutions are the cortical parts most intimately concerned Nothnagel agrees with Segu n in this limita t on of the essential tracts

H. Munk *Functionen der G sshirnrind* (Berlin, 83) pp 36–4 Ferrier *Functions* et d ed., ch p ix, pt 1. Brown and Schä f in *Philo Transact ons* vol 9 p 3 ...errier f nd traces f sight with both occipital

F cases see Flechsig *D. Leitung b hne in G hirn u. Ruckenmark* (Le ps... ... T Exner *U tersuchungen* et p. 83 F rre *Localisa on* ; p François-Franck's *C rre ... cur* p 63 t

E. C. Seguin Hemianopsia f C rebral Origin, in *Journal f N rv us nd Mental Dis* eas vol. xiii, p 30. N thnagel und N unyn *U ber die Localisation der G hirnk ankheiten* (Wiesbaden, 887) p ...

occipital lobes are gone may run against things frequently and yet see not withstanding The best proof that they may see is that which Goltz s dogs fur nished they carefully avoided as it seemed strips of sunshine or paper on the floor as if they were solid obstacles This no really blind dog would do Luciani tested his dogs when hungry (a condition which sharpens their atten tion) by strewing pieces of meat and pieces of cork before them If they went straight at them they *saw* and *if they chose the meat and left the cork they saw discriminatingly* The quarrel is very acrimonious indeed the subject of *localization of functions in the brain seems to have a peculiar effect on the* temper of those who cultivate it experimentally The amount of preserved vi sion which Goltz and Luciani report seems hardly to be worth considering on

that out

f produc

The safe

conclusion for *us* is that Luciani s diagram Fig 14 represents something like

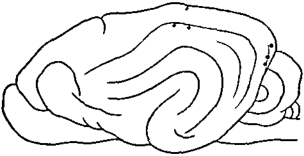


FIG 14 Di tr buti n of the visu l function in the cortex acco ding to Luciani

the truth The occipital lobes are far more important for vision than any other part of the cortex so that their complete destruction makes the animal almost blind As for the crude sensibility to light which *may* then remain nothing exact is known either about its nature or its seat

In the monkey doctors also disagree The truth seems however to be that the *occipital* lobes in this animal also are the part connected most intimately with the visual function The function would seem to go on when very small portions of them are left for Ferrier found no appreciable impairment of it after almost complete destruction of them on both sides On the other hand he found complete and permanent blindness to ensue when they and the

d on both ides Munk as well as Brown

due to inhibitions exerted *in distans* o

passing under the angular gyri on their way to the occipital lobes Brown and Schaefer got complete and permanent blindness in one monkey from total destruction of both occipital lobes Luciani and Seppili performing this opera tion on two monkeys found that the animals were only mentally not sensori ally blind After some weeks they saw their food but could not distinguish by sight between figs and pieces of cork Luciani and Seppili seem however not

[1] Berlin Academy *Sitzsb* 1886 vii viii p 124

to have extirpated the entire lobes When one lobe only is injured the affection of sight is hemiopic in monkeys in this all observers agree On the whole then Munk s original location of vision in the occipital lobes is confirmed by the later evidence

In man we have more exact results since we are not driven to interpret the vision from the outward conduct. On the other hand however we cannot vivisect, but must wait for pathological lesions to turn up The pathologists who ... literature is ted ous *ad l bitum*) conclude that the ... Hemiopic disturb- ... d total blindness

Hemiopia may also res ... cially the neighboring angular and supra marginal gyri, and it may accompany extensive injury in the motor region of the cortex. In these cases it seems probable that it is due to an *actio n distans* probably to the interruption of fibres proceeding from the occipital lobe There eem to be a few cases on record where there was injury to the occipital lobes without visual defect. Ferrier has collected as man as possible to prove his localization in the angular gyrus A trict ppli cation of logical principles would make one of these cases outweigh one hundred contrary ones And yet remembering how imperfect observations may be and how ind vidual brains may vary it would certainly be rash for their sake to throw away the enormous amount of pos tive evidence for the occipital l bes. Individual variability is always a *poss ble* explanation of an anomalous case There is no more prominent anatomical f ct than that of the decussa tion of the p ramids nor any more usual pathological fact than its consequence that left handed hemorrha es into the motor region produce right handed paralyses And yet the decussation is variable in amount and seems sometimes to be ab ent altogether If in such a case as this la t the left brain were to becom the seat of apoplexy the left and not the right half of the body would be the one to suffer paralysis.

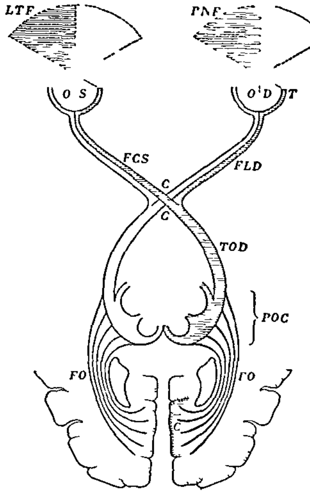
The *schema* on page 3 cop ed from Dr Seguin expresses on the whole the probable truth about the regions concerned in vision Not the entire occipital lobes, but the so-called cunei and the first con olutions, are the cortical parts most intimately concerned Nothnagel agrees with Seguin in this limitation of the essential tracts

H. Munk *Functionen der Grosshirnrinde* (Berlin, 8) pp. 35–42. Ferrier *Functions etc* d ed., chap. ix, pt. 2. Brown and Schaef in *Philo Transact ons* vol 9 p 3 Luciani u. Seppili, 9 cit pp. 3 8 Lannegrace found traces f sight with both occipital lobes destroyed, and in one case even when angular gyri and occipital lobes were de- ... *I ... experimen ... f* January and Cent .Blatt 889 p. ... ppears t have con- ... nce f men.

?? ? Exner *Untersuchungen* etc, p. 83 Ferrier *Localisation* etc p Franck's *Cerveau moteur* p 65 te. François-

E. C. Seguin Hemianopsia f Cerebral Origin," in *Journal f Nervous and Men al Dis* ase vol xiii, p ... Nothnagel und Naunyn *U ber die Localisation der G hirnkra kheiten* (Wiesbaden, 1887) p ...

A most interesting effect of cortical disorder is *mental blindness* This consists not so much in insensibility to optical impressions as in *inability to understand them* Psychologically it is interpretable as *loss of associations* be-



[illegible] The [illegible]

the lateral or temporal half [illegible] of the right [illegible] are those going to the central or nasal half of the left retina *O D* is the right and *O S* the left eyeball The rightward half of each is therefore blind in other words the right nasal field *R N F* and the left temporal field *L T F* have become invisible to the subject with the les[illegible] at *Cu*

tween optical sensations and what they signify and any interruption of the paths between the optic centres and the centres for other ideas ought to bring it about Thus printed letters of the alphabet or words signify certain sounds and certain articulatory movements If the connection between the articulating or auditory centres on the one hand and the visual centres on the other be ruptured we ought *a priori* to expect that the sight of words would fail to

awaken the idea of their sound, or the movement for pronouncing them. We ought, in short, to have *alexia*, or inability to read; and this is just what we do have in many cases of extensive injury about the fronto-temporal regions as a complication of *aphasic* disease. Nothnagel suggests that whilst the *cuneus* is the seat of optical *sensations*, the other parts of the occipital lobe may be the field of optical *memories and ideas*, from the loss of which mental blindness should ensue. In fact, all the medical authors speak of mental blindness as if it must consist in the loss of visual images from the memory. It seems to me, however, that this is a psychological misapprehension. A man whose power of visual imagination has decayed (no unusual phenomenon in its lighter grades) is not mentally blind in the least, for he recognizes perfectly all that he sees. On the other hand, he may be mentally blind, with his optical imagination well preserved, as in the interesting case published by Wilbrand in 1887.[1] In the still more interesting case of mental blindness recently published by Lissauer,[2] though the patient made the most ludicrous mistakes, calling for instance a clothes-brush a pair of spectacles, an umbrella a plant with flowers, an apple a portrait of a lady, etc., etc., he seemed, according to the reporter, to have his mental images fairly well preserved. It is in fact the momentary loss of our *non-optical* images which makes us mentally blind, just as it is that of our *non-auditory* images which makes us mentally deaf. I am mentally deaf if, *hearing* a bell, I can't recall how it *looks*; and mentally blind if, *seeing* it, I can't recall its *sound* or its *name*. As a matter of fact, I should have to be not merely mentally blind, but stone-blind, if all my visual images were lost. For although I am blind to the right half of the field of view if my left occipital region is injured, such hemianopsia does not deprive me of visual ideas, experience seeming to show that the unaffected hemisphere is always sufficient for production of these. To abolish them entirely I should have to be deprived of both occipital lobes, and that would deprive me not only of my inward images of sight, but of my sight altogether. Recent pathological annals seem to offer a few such cases.[3] Meanwhile there are a number of cases of mental blindness, especially for written language, coupled with hemianopsia, usually of the rightward field of view. These are all explicable by the breaking down, through disease, of the connecting tracts between the occipital lobes and other parts of the brain, especially those which go to the centres for speech in the frontal and temporal regions of the left hemisphere. They are to be classed among disturbances of conduction, or of association; and nowhere can I find any fact which should force us to believe that optical images need be lost in mental blindness, or

[1] *Die Seelenblindheit*, etc., p. [illegible]. The mental blindness was in this woman's case moderate in degree.

[2] *Archiv f. Psychiatrie*, vol. [illegible], p. [illegible].

[3] Wilbrand (op. cit. p. [illegible]) says: *Die* [illegible]. He gives, however, no case [illegible] that [illegible] cortical lesion may make one stone-blind and yet not deprive one of visual images, so that I do not know whether it is an hypothesis [illegible].

[4] A case reported by C. Freund, *Archiv f. Psychiatrie*, vol. xx, [illegible] occipital lobes were injured, but the cortex was not destroyed on both sides. There was still vision. Cf. pp. [illegible].

[5] I say "need," for I do not of course deny the possible coincidence of the two symptoms. [illegible] brain-lesion might block certain associations and at the same time impair visual

that the cerebral centres for such images are locally distinct from those for di rect sensations from the eyes [1]

Where an object fails to be recognized by sight it often happens that the patient will recognize and name it as soon as he touches it with his hand This shows in an interesting way how numerous the associative paths are which all end by running out of the brain through the channel of speech The hand path is open though the eye path be closed When mental blindness is most com plete neither sight touch nor sound avails to steer the patient and a sort of dementia which has been called *asymbolia* or *apraxia* is the result The commonest articles are not understood The patient will put his breeches on one shoulder and his hat upon the other will bite into the soap and lay his shoes on the table or take his food into his hand and throw it down again not knowing what to do with it etc Such disorder can only come from extensive brain injury [2]

The *method of degeneration* corroborates the other evidence localizing the tracts of vision In young animals one gets secondary degeneration of the oc cipital regions from destroying an eyeball and *vice versa* degeneration of the optic nerves from destroying the occipital regions The corpora geniculata thalami and subcortical fibres leading to the occipital lobes are also found atrophied in these cases The phenomena are not uniform but are indispu table [3] so that taking all lines of evidence together the special connection of vision with the occipital lobes is perfectly made out It should be added that the occipital lobes have frequently been found shrunken in cases of inveterate blindness in man

Hearing

Hearing is hardly as definitely localized as sight *In the dog* Luciani s dia gram *will show the regions which directly or indirectly affect it for the worse* when injured As with sight one sided lesions produce symptoms on both sides The mixture of black dots and gray dots in the diagram is meant to rep resent this mixture of crossed and uncrossed connections though of course no topographical exactitude is aimed at Of all the region the temporal lobe is the most important part yet permanent absolute deafness did not result in a

imagin t on without enti ely stopping vis on Such a case seems to have be n the remark able one f om Charc t w h ch I shall g ve rather fully in the chapter on Im gination

[2] F eund (in the a ticle c ted above *Ueber optiscl e Apl e u d Seel bli dl e t*) and Bruns (*E n Fall von Alex e etc* in the *Neurologiscl es Cent lbl tt* for 1888 pp 581 509)

1881) vol II p 554

Bah by von

x

do of Lucianı s even from bilateral destruction of both temporal lobes in the r entirety

In the monkey Ferrier and Yeo once found permanent deafness to follow destruction of the upper temporal convolution (the one just below the fissure of Sylvius in Fig 6) on both sides Brown and Schaefer found on the contrary that in several monkeys this operation failed to noticeably affect the hearing In one animal indeed both ent re temporal lobes were destroyed After a week or two of depression of the mental faculties this beast recovered and be came one of the bri htest monkeys possible domineerin over all his mates

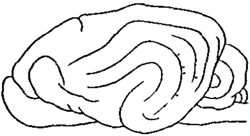


FIG 6 L ciani h ing gt

and admitted by all who saw him to have all his senses including hearing

ı ensued between

were

nsatis

portant part The phenomena of aphasia show this We studied motor aphasia a few pa es back we must now consider *se sory aphas a* Our knowled e of this d sease has had three stages we may talk of the period of Broca the pe r od of We nicke and the pe iod of Charcot What Broca s disco ery was we h e seen Wernicke was the first to d scriminate those cases in which the pa tient can *ot e en u dersta d* speech from those in wh ch he can understand only not talk and to ascribe the former co d tion to lesion of the temporal

n

wh ch the pat ent could read talk and write but not understand what was said to him the lesion was l mited to the f rst and second temporal convolu tions in their po te or two th d The les on (n right handed i e left brained persons) is always on the left s de like the les on in motor aphasia Crude hearin would not be aboli hed even were the left centre for it utterly de-

D F t Lo t t Dog \ d p 6 p t
Phil T 1 79 p 3 B L xi, p [4] *Ibid* p 47
Der phasis k Sympt menc mpl (874) S in F th co l u m ked
WERNICKE. "Th P th logy f S n ry Aphasia B J ly 889

stroyed the right centre would still provide for that. But the *linguistic use* of hearing appears bound up with the integrity of the left centre more or less exclusively. Here it must be that words heard enter into association with the things which they represent on the one hand, and with the movements necessary for pronouncing them on the other. In a large majority of Dr. Starr's fifty cases the power either to name objects or to talk coherently was impaired. This shows that in most of us (as Wernicke said) speech must go on from auditory cues; that is, it must be that our ideas do not innervate our motor centres directly, but only after first arousing the mental sound of the words.

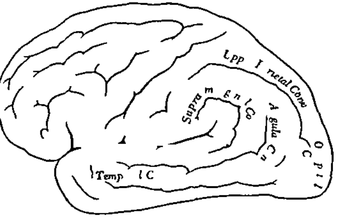


FIG. 17.

This is the immediate stimulus to articulation; and where the possibility of this is abolished by the destruction of its usual channel in the left temporal lobe, the articulation must suffer. In the few cases in which the channel is abolished with no bad effect on speech we must suppose an idiosyncrasy. The patient must innervate his speech orgar

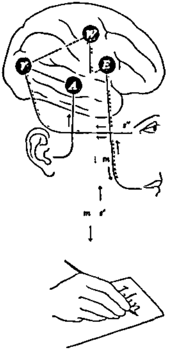
the other hemisphere or directly

vision, touch, etc., without lean

analysis of the facts in the light of such individual differences as these which constitutes Charcot's contribution towards clearing up the subject.

Every namable thing, act, or relation has numerous properties, qualities, or aspects. In our minds the properties of each thing, together with its name, form an associated group. If different parts of the brain are severally concerned with the several properties, and a farther part with the hearing, and still another with the uttering, of the name, there must inevitably be brought about (through the law of association which we shall later study) such a dynamic connection amongst all these brain parts that the activity of any one of them will be likely to awaken the activity of all the rest. When we are talking as we think, the *ultimate* process is that of utterance. If the brain part for *that* be injured, speech is impossible or disorderly, even though all the other brain parts be intact; and this is just the condition of things which, on page 25, we found to be brought about by limited lesion of the left inferior frontal convolution. But back of that last act various orders of succession are possible in the associations of a talking man's ideas. The more usual order seems to be from the tactile, visual, or other properties of the things thought about to the

sound of their names and then to the latter s utterance But if in a certain individual the thought of the *look* of an object or of the *look* of its printed name be the process which habitually precedes articulation then the loss of
f t affect that individual s speech He will be
be
af
ne s which figure in Dr Starr s table



F S

If this order of association be in rained and habitual in that individual injury to his *visual* centres will make him not only word blind but aphasic as well Hi speech will become confused in consequence of an occipital lesion Naunyn con equently plot ting out on a diagram of the hemi phere the 71 irreproachably reported cases of aphas a which he was able to collect finds that the lesions concentrate themselves in three places first on Broca s centre ec ond on Wernicke s third on the supra marginal and angular gyri under which those fibres pass which connect the visual centres w th the rest of the brain (see Fi 17) With this result Dr Starr s analysis of purely sensory cases agrees

In a later chapter we shall again return to these differences in the effectiveness of the sensory spheres in d fferent individuals Meanwhile few thin s show more beautifully than the history of our knowled e of apha sia how the sagacity and patience of many banded workers are in time certain to ana lyze the darkest confus on into an orderly d splay There is no centre of speech in the brain any more than there is a faculty
man wh
parts m
explana u (see g 18)

Smell

Everything conspires to po nt to the median descendin part of the temporal l bes as be n the organs of mell Even Ferrier and Munk agree on the h p pocampal gyrus thou h Ferrier restricts olfaction as Munk does not to the lobule or u cinate process of the convolution reserving the rest of it for touch Anatomy and pathology also po nt to the h ppocampal gyrus but as the mat

\ thnag l d \ unyn p t plat
Ball t d B rna d ks cit d p 34 th m t ccess bl d cum ts f Ch ot school Ba tian book *Th B ai as O g f M d* (l t th ch pt rs) is lso good.

stroyed the right centre would still provide for that But the *linguistic use* of hearing appears bound up with the integrity of the left centre more or less exclusively Here it must be that words heard enter into association with the things which they represent on the one hand and with the movements necessary for pronouncing them on the other In a large majority of Dr Starr s fifty cases the power either to name objects or to talk coherently was impaired This shows that in most of us (as Wernicke said) speech must go on from auditory cues that is it must be that our ideas do not innervate our motor centres directly but only after first arousing the mental sound of the words

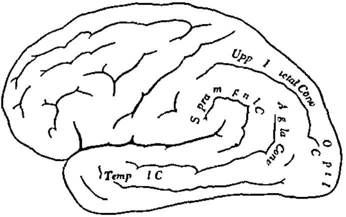


FIG 17

This is the immediate stimulus to articulation and where the possibility of this *is abolished by the destruction of its usual channel in the left temporal lobe* the articulation must suffer In the few cases in which the channel is abolished with no bad effect on speech we must suppose an idiosyncrasy The patient *must innervate his speech organs either from the* corresponding portion of the other hemisphere or directly from the centres of ideation those namely of vision touch etc. without leaning on the auditory region It is the minuter analysis of the facts in the light of such individual differences as these which constitutes Charcot s contribution towards clearing up the subject

Every namable thing act or relation has numerous properties qualities or aspects In our minds the properties of each thing together with its name form an associated group If different parts of the brain are severally concerned with the several properties and a farther part with the hearing and still another with the uttering of the name there must inevitably be brought about (through the law of association which we shall later study) such a dynamic connection amongst all these brain parts that the activity of any one of them will be likely to awaken the activity of all the rest When we are talking as we think the *ultimate* process is that of utterance If the brain part for *that* be injured speech is impossible or disorderly even though all the other brain parts be intact and this is just the condition of things which on page 5 we found to be brought about by limited *lesion of the left inferior frontal convolution* But back of that last act various orders of succession are possible in the associations of a talking man s ideas The more usual order seems to be from the *tactile visual or other properties* of the things thought about to the

part Such a view would be important if true through its bearings on the psychology of volition What is the truth? As regards the fact of cutaneous anæsthesia from motor zone ablations all other observers are against Ferrier so that he is probably wrong in denying it On the other hand Munk and Schiff are wron in making the motor symptoms *depend* on the anæsthesia for in certain rare cases they have been observed to exist not only without insensibility but with actual hyperæsthesia of the parts The motor and sensory symptoms eem therefore to be independent variables

In monkeys the latest experiments are those of Horsley and Schaefer

just below the callosomarginal fissure in F g 7) The insensibility is at its maximum when the entire tract comprisin both convolutions is destroyed Ferrier sa s that the sensibility of monkeys is entirely unaffected by ablations of the motor zone and Horsley and Schaefer consider it by no means necessarily abolished Luciani found it dimin shed in his three experiments on apes

In ma we have the fact that one-sided paralysis from disease of the opposite motor zone may or may not be occompanied with anæsthesia of the parts Luciani who believes that the motor zone is also sensory tries to minimize the value of this evidence by po ntin to the insufficiency with which patients are examined He himself bel eves that in do s the tactile sphere extends backwards and forwards of the d rectly excitable region into the frontal and pari

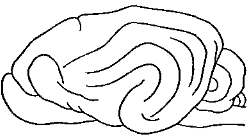


Fig L ciani t ctil m th d g

etal lobes (see F 20) Nothnagel considers that patholo ical evidence points in the same d rection a d Dr Mills carefully reviewin the evidence adds the gyri fornicatus and h ppocampi to the cutaneo-muscular region in man

Becht ew (*Pfl g r' A hiv* L 35 p 37) f d anæsthesia in cat with m t svm t m f m blati f gm d gyrus L cia g t hype æsth ia xi t t with rtical m t d f ct in dog by multaneo l hemisectin th sp l co d (L cian u. S ppili, *p* ci p 34) G ltz freq ently f d hyperæ th ia f th wh l body t mpany m t d fect fter bl ti f both f tal l bes d b f d it ft blati th m t ne (*Pfl ger' A hiv* l 34 p 47)

Phil phical T act on L 79 p ff *F t* p 375

Op cit pp 5 7 L ciani Seppil *p cit* pp 75 88

T *t* *f C g* t p 7 *Op t* p 8

ter is less interesting from the point of view of human psychology than were sight and hearing I will say no more but simply add Luciani and Seppili s diagram of the dog s smell centre [1] Of

Taste

we know little that is definite What little there is points to the lower temporal regions again Consult Ferrier as below

Touch

Interesting problems arise with regard to the seat of tactile and muscular sensibility Hitzig whose experiments on *dogs brains* fifteen years ago opened

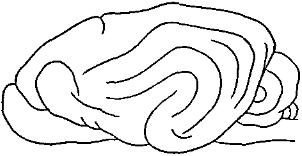


FIG 19 Lucian s olfactory region in the dog

the entire subject which we are discussing ascribed the disorders of motility observed after ablations of the motor region to a loss of what he called muscular consciousness The animals do not notice eccentric positions of their limbs will stand with their legs crossed with the affected paw resting on its back or hanging over a t ble s edge etc and do not resist our bending and stretching of it as they resist with the unaffected paw Goltz Munk Schiff Herzen and others *promptly ascertained an equal defect of cutaneous sensibility to* pain touch and cold The paw is not withdrawn when pinched remains standing in cold water etc Ferrier meanwhile denied that there was any true anæsthesia produced by ablations in the motor zone and explains the appearance of it as an effect of the sluggish motor responses of the affected side [2] Munk[3] and Schiff [4] on the contrary conceive of the motor zone as essentially sensory and in different ways explain the motor disorders as secondary results of the anæsthesia which is always there Munk calls the motor zone the

[3] *Übe d e Funct onen d G osshi r de* (1881) p 50
[4] *Le on d Fisiolog a spe mentale s l sist m nervoso e ef l co* (1873) p 5 7 ff Also *Brai* vol IX p 298

the path between the optical and the graphic centres remains open whilst that between the opt cal and the auditory and articulatory cenires is closed Only thus can we understand how the look of the writing should fail to suggest the sound of the words to the pati nt mind whilst it still suggests the proper movements of graphic imitation These movements in their turn must of course be felt and the feeling of them must be associated with the centres for hearing and pronouncing the words The injury in cases like this where very special combinations fail whilst others go on as usual must always be sup- ... of ... creased resistance to the passa e of certain cur ... destroyed ... atient who can both read and write with his ... l graphic centre at once ensory and motor for both operations

I ha e now given as far as the nature of this book will allow a complete account of the present sta e of the localizat on-question In its main outlines it tands firm thou h much has s ill to be di co ered The anterior frontal lobes for example so far as is yet known have no definite functions Goltz finds that dogs bereft of them both are incessantly in motion and excitable b every small timulus They are irascibl and amative in an extraordinary degree and the r ides grow bare w th perpetual reflex scratchin but they how no l c l troubles of either motion or sensibility In monkeys not e en this lack of inhibitory ab l ty is hown and neither stimulation nor exci ion of the prefrontal lobes produces any symptoms whatever One monkey of Horsley and Schaefer s was as tame an l d l certa n tr cks as well af er as before the operation It is probable that we have about reached the limits of what can be learned about brain funct ons from ... sectin infer or an mals and that we mu t h reafter look more e clu ivel to human patholo y for l ht The exi tence of eparate peech and writin centres in the left hemi phere n man the fact that palsy from cort cal i jury is so much mo e complete and endurin in man and the monkey than n dogs and the farther fact that it seems more difficult to get complete sen orial blindness from cortical ablations in the lower an mals than n man all show that funct ons get more specially localized as evolution goes ... I bi d localizat n eems hardly to exi t and n rodents it is much less com p c us than n carni ora Even for man however Munk s way of mapping out the corte into bsolute areas with n which only one mo ement or ...

sented throu hout the *whole* of the correspondin ... pepper and salt sprinkled from the same caster This howe er does not prevent each "part from ha its *focus* at one spot with n the brain region The various bra n regions merge into each other in the same mixed way As Mr Horsley sa s There are border centres and the area of representation of the face merges into that for the representation of the upper limb If there was a focal les on at that point you would ha e the movements of these two parts starting

Philo ... hical T ansaction vol. 79 p 3.

If one compare Luciani s diagrams together (Figs 14 16, 19 20) one will see that the entire parietal region of the dog s skull is common to the four senses of sight hearing smell and touch including muscular feeling The corresponding region in the human brain (upper parietal and supra marginal gyri —see Fig 17 p 36) seems to be a somewhat similar place of conflux Optical aphasias and motor and tactile disturbances all result from its injury especially when that is on the left side[1] The lower we go in the animal scale the less differentiated the functions of the several brain parts seem to be[2] It may be that the region in question still represents in ourselves something like this primitive condition and that the surrounding parts in adapting themselves more and more to specialized and narrow functions have left it as a sort of *carrefour* through which they send currents and converse That it should be connected with musculo cutaneous feeling is however no reason why the motor zone proper should not be so connected too And the cases of paralysis from the motor zone with no accompanying anæsthesia may be explicable without denying all sensory function to that region For as my colleague Dr James Putnam informs me sensibility is always harder to kill than motility even where we know for a certainty that the lesion affects tracts that are both sensory and motor *Persons whose hand is paralyzed in its movements from* compression of arm nerves during sleep still feel with their fingers and they may still feel in their feet when their legs are paralyzed by bruising of the *spinal cord In a similar way the motor cortex might be sensitive as well as* motor and yet by this greater subtlety (or whatever the peculiarity may be) in the sensory currents the sensibility might survive an amount of injury there by which the motility was destroyed Nothnagel considers that there are grounds for supposing the *muscular* sense to be exclusively connected with the parietal lobe and not with the motor zone Disease of this lobe gives pure ataxy without palsy and of the motor zone pure palsy without loss of muscular sense[3] He fails however to convince more competent critics than the present writer[4] so I conclude with them that as yet we have no decisive grounds for locating muscular and cutaneous feeling apart Much still remains to be learned about the relations between musculo cutaneous sensibility and the cortex but one thing is certain that neither the occipital the forward frontal nor the temporal lobes seem to have anything essential to do with it in man It is knit up with the performances of the *motor one and of the convolutions backwards and midwards of them* The reader must remember this conclusion when we come to the chapter on the Will

I must add a word about the connection of aphasia with the tactile sense On p 26 I spoke of those cases in which the patient can write but not read his own writing He cannot *read by his eyes but he can read by the feeling* in his fingers if he retrace the letters in the air It is convenient for such a patient to have a pen in hand whilst reading in this way in order to make the usual *feeling of writing more complete*[5] In such a case we must suppose that

[1] See E ners *Unters ub Local t n* pl te xxv
— — F t ch n iv nd chap x §§ 6 to 9 [3] *Op c t* p 17
n *Best ge z Leh e v d Loc l t m Geh n* p 84

Man s Consciousness Limited To The Hemispheres

But is the consc ousness which accompanies the activity of the cortex the only consciousness that man has? or *are his lower centres conscious as well?*

This is a difficult question to decide how difficult one only learns when one discovers that the cortex-consciousness itself of certain objects can be eem l annihilated in any good hypnotic subject by a h n oved hile the rest of the subject s mind as that m nu the mind of the bystanders[2] The lower centres them elves may conceivably all the while have a split off consciousness of their own similarly ejective to the cortex-consciousness but whether they have it or not can never be known from merely introspective evidence. Meanwhile the fact that occipital destruction in man may cause a blindness which is apparently absolute (no feeling remaining either of light or dark over one half of the field of view) would lead us to suppose that if our lower optical centres the corpora quadrigemina and thalami do have any con ciousness it is at all events a con ciou ness which does not mix with that which ac companies the cortical activities and which has nothing to do with our personal Self In lower ani mals this may not be so much the case The traces

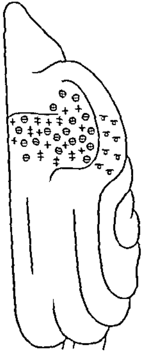


FIG. Dog m t ce tres ght hemisphere ccording t Pan th Th points f th m t regi ar correlated as f llows with muscles th *loop* with th *orbicularis palp brarum* t *h* *p l* *cr* with th *f* th *cr sse* m crib d *circle* with th *tensor d git* *m* *mm* s l th f re paw th *plam cr le* with th *b ductor p llicis longus* th d *ble cr se* with th *ex* *or omm ms* f th hind limb

centres of these animals saw and that what they saw was not ejective but objective to the remaining cortex i e it formed part of one and the same inner world with the things which that cortex per ceived It may be however that the phenomena were due to the fact that in these animals the corti cal centres for vi ion reach outs de of the occipi tal zone and that destruction of the latter fails to remove them as completely as in man This as we know is the opinion of the experimenters them sel es For practical purposes nevertheless and lim ting the meanin of the word consciousness to the personal self of the individual we can pretty confidently answer the question prefixed to this paragraph by sayin that *the*

F th word see T K. Cliff rd *Lectur* d *Ess y* (1879) vol II, p 7

See below Chapter VIII.

together'[1] The accompanying figure from Paneth shows just how the matter stands in the dog[2]

I am speaking now of localizations breadthwise over the brain surface It is conceivable that there might be also localizations depthwise through the cortex The more superficial cells are smaller the deepest layer of them is large and it has been suggested that the superficial cells are sensorial the deeper ones motor[3] or that the superficial ones in the motor region are correlated with the extremities of the organs to be moved (fingers etc) the deeper ones with the more central segments (wrist elbow etc)[4] It need hardly be said that all such theories are as yet but guesses

We thus see that the postulate of Meynert and Jackson which we started with on p 19 is on the whole most satisfactorily corroborated by subsequent objective research *The highest centres do probably contain nothing but arrangements for representing impressions and movements and other arrangements for coupling the activity of these arrangements together*[5] Currents pouring in from the sense organs first excite some arrangements which in turn excite others until at last a motor discharge downwards of some sort occurs When this is once clearly grasped there remains little ground for keeping up that old controversy about the motor zone as to whether it is in reality motor or sensitive The whole cortex inasmuch as currents run through it is both All the currents probably have feelings going with them and sooner or later bring movements about In one aspect then every centre is afferent in another efferent even the motor cells of the spinal cord having these two aspects inseparably conjoined Marique and Exner and Paneth[7] have shown that by cutting *round* a motor centre and so separating it from the influence of the rest of the cortex the same disorders are produced as by cutting it out so that really it is only the mouth of the funnel as it were through which the stream of innervation starting from elsewhere pours[8] consciousness accompanying the stream and being mainly of things seen if the stream is strongest occipitally of things heard if it is strongest temporally of things felt etc if the stream occupies most intensely the motor zone It seems to me that some broad and vague formulation like this is as much as we can safely venture on in the present state of science and in subsequent chapters I expect to give confirmatory reasons for my view

[1] p 343 B e r an l H rs beaut f I wo k yet done es

for p eci n

[2] *Pflüger's Arch v* (1885) vol 37 p 523

erally preposterous l ok *The B ain* al o by Horsley

them as an org n of vol 1 p 233 ff) but so far as this wo q t rece tly it was om the a g gate of

I

ente s into it so common to talk of an ideational centre as of s u other cent es Fortunately this cust m is alre dy on the wane

le fonct o nement des c nt s psycl o moteurs (Brus els 885)

o)

Man's Consciousness Limited To The Hemispheres

But is the consciousness which accompanies the activity of the cortex the only consciousness that man has? or are his lower centres conscious as well?

This is a difficult question to decide, how difficult one only learns when one discovers that the cortex-consciousness itself of certain objects can be seemingly annihilated in any good hypnotic subject by a bare wave of his operator's hand, and yet be proved by circumstantial evidence to exist all the while in a split-off condition quite as 'ejective'[1] to the rest of the subject's mind as that mind is to the mind of the bystanders. The lower centres themselves may conceivably all the while have a split-off consciousness of their own, similarly ejective to the cortex-consciousness; but whether they have it or not can never be known from merely introspective evidence. Meanwhile the fact that occipital destruction in man may cause a blindness which is apparently absolute (no feeling remaining either of light or dark over one half of the field of view) would lead us to suppose that if our lower optical centres, the corpora quadrigemina, and thalami, do have any consciousness, it is at all events a consciousness which does not mix with that which accompanies the cortical activities, and which has nothing to do with our personal Self. In lower animals this may not be so much the case. The traces of sight found (*supra*, p. 50) in dogs and monkeys whose occipital lobes were entirely destroyed, may possibly have been due to the fact that the lower centres of these animals saw, and that what they saw was not ejective but objective to the remaining cortex, i.e., it formed part of one and the same inner world with the things which that cortex perceived. It may be, however, that the phenomena were due to the fact that in these animals the cortical centres for vision reach outside of the occipital zone, and that destruction of the latter fails to remove them as completely as in man. This, as we know, is the opinion of the experimenters themselves. For practical purposes, nevertheless, and limiting the meaning of the word consciousness to the personal self of the individual, we can pretty confidently answer the question prefixed to this paragraph by saying that *the*

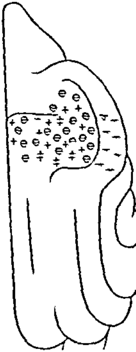


Fig. Dog's motor centres, right hemisphere (according to Paneth). The points of the motor-region are correlated as follows with muscles: the *loops* with the *orbicularis palpebrarum* ... the *crosses* with the *flexor*; the *crosses surrounded by circles* with the *extensor digitorum communis* of the fore-paw; the *plain circles* with the *abductor pollicis longus*; the ... *crosses* with the *extensor communis* of the hind-limb.

[1] For the word, see W. K. Clifford's *Lectures and Essays* (1879), vol. II, p. See below Chapter VIII.

cortex is the sole organ of consciousness in man[1] If there be any consciousness pertaining to the lower centres, it is a consciousness of which the self knows nothing

The Restitution Of Function

Another problem not so metaphysical remains The most general and striking fact connected with cortical injury is that of the *restoration of function* Functions lost at first are after a few days or weeks restored *How are we to understand this restitution?*

Two theories are in the field

1) Restitution is due to the vicarious action either of the rest of the cortex or of centres lower down acquiring functions which until then they had not performed

2) It is due to the remaining centres (whether cortical or lower) resuming functions which they had always had but of which the wound had temporarily inhibited the exercise This is the view of which Goltz and Brown Sequard are the most distinguished defenders

Inhibition is a *vera causa* of that there can be no doubt The pneumogastric nerve *inhibits the heart the splanchnic inhibits the intestinal movements and* the superior laryngeal those of inspiration The nerve irritations which may inhibit the contraction of arterioles are innumerable and reflex actions are often repressed by the simultaneous excitement of other sensory nerves For all such facts the reader must consult the treatises on physiology What concerns us here is the inhibition exerted by different parts of the nerve centres when irritated on the activity of distant parts The flaccidity of a frog from shock for a minute or so after his medulla oblongata is cut is an inhibition from the seat of injury which quickly passes away

What is known as surgical shock (unconsciousness pallor dilatation of splanchnic blood vessels and general syncope and collapse) in the human subject is an inhibition which lasts a longer time Goltz Freusberg and others

independent vaso motor centres centres for erection for control of the sphincters etc which could be excited to activity by tactile stimuli and as readily reinhibited by others simultaneously applied[2] We may therefore plausibly suppose that the rapid reappearance of motility vision etc after their first disappearance in consequence of a cortical mutilation is due to the passing off of inhibitions exerted by the irritated surface of the wound The only question is whether *all* restorations of function must be explained in this one simple way or whether some part of them may not be owing to the formation of entirely new paths in the remaining centres by which they become educated to

Leçons sur la phy l d
Maudsley *Phys ology of*
l Basis of Mi d Prob
given
10 p 174

duties which they did not originally possess In favor of an indefinite extension of the inhibition theory facts may be cited such as the followin In dogs whose disturbances due to cortical lesion have disappeared they may in consequence of some inner or outer accident reappear in all their intensity for 24 hours or so and then disappear again In a dog made half blind by an operation and then shut up in the dark, vision comes back ju t as quickly as in other similar dogs whose sight is exercised systematically every day A dog which has learned to beg before the operation recommences this practice quite *spontaneously* a week after a double sided ablat on of the motor zone Occasionally in a pi eon (or even it is said in a dog) we see the disturbances less marked immediately after the operation than they are half an hour later This would be impossible were they due to the subtraction of the organs which normally carried them on Moreover the entire drift of recent physiological and pathological speculation is towards enthroning inhibition as an ever present and indispensable condition of orderly activity We shall see how great is its importance in the chapter on the Will Mr Charles Mercier considers that no muscular contraction once begun would ever stop without it short of ex

than in stretching it too far as an explanation of the phenomena following cortical lesion

On the other hand if we admit *no* re-education of centres we not only fly in the face of an *a priori* probability but we find oursel es compelled by facts to suppose an almo t incredible number of functions natively lod ed in the centres below the *thal mi* or e en in those below the *corpora quad i em na* I will cons der the *a p ori* objection after first taking a look at the facts which I ha e in mind They confront us the moment we ask ourselves just *wh ch are the pa ts wh ch perform the fu ctions abolished by an operation after suffi c e t time has elapsed for restoration to occur?*

after waitin till restitution had occurred cutting it out on the opposite side as well Goltz and others have done the same thing If the opposite side were really the seat of the restored function the or ginal palsy should have ap-

G ltz *Verrichtungen d G hirn* p 73 Lo b in *Pfl ger' A hiv* L 39 p. 76
Ibid p 89 Schrad *bid* L 44 p 8.
Th Nervo Syst m d th M d (8) h ps in, vi lso in *B ain* vol xi p 36
B wn-Séqu d has given esumé f his pinions in the *A hives d Physiologi f* Oct 889 5th Series, I. I, p 75
Goltz first pplied th inh b ti theory t th brain in his *Verrichtungen d G h rns* p 39 ff On th general philosophy f Inhib tio the reader may nsult Brunt *Phar mat logy nd Ther peutics*, p 54 ff and also in *Natur* v l 7 p 4 9 ff
E.g H rzen, in H rman Schwalbe *J h bericht f* 886 *Phy l. Abth* p. 38 (E periments on ew born pupp es.)

But here again experiment seems to upset the hypothesis so far as the motor zone goes at least for we may wait till motility has returned in the affected limb and then both irritate the cortex surrounding the wound without exciting the limb to movement and ablate it without bringing back the vanished palsy [1] It would accordingly seem that *the cerebral centres below the cortex* must be

[illegible]

kept him alive until a surprisingly small amount of motor a[illegible]

ance remained [2] These centres cannot here have accounted for the restitution He has even as it would appear [3] ablated both the hemispheres of a dog and kept him alive 51 days able to walk and stand The corpora striata and thalami in this dog were also practically gone In view of such results we seem driven with M François Franck [4] to fall back *on the ganglia lower still or even on the spinal cord* as the vicarious organ of which we are in quest If the abeyance of function between the operation and the restoration was due *exclusively* to inhibition then we must suppose these lowest centres to be in reality extremely accomplished organs They must always have done what we now find them *doing after function is restored even when the hemispheres were intact Of* course this is conceivably the case yet it does not seem very plausible And the *a priori* considerations which a moment since I said I should urge make it less plausible still

For in the first place the brain is essentially a place of currents which run *in organized paths Loss of function can only mean one of two things* either that a current can no longer run in or that if it runs in it can no longer run out by its old path Either of these inabilities may come from a local ablation and restitution can then only mean that in spite of a temporary block an inrunning current has at last become enabled to flow out by its old path again —e g the sound of give your paw *discharges after some weeks into the same* canine muscles into which it used to discharge before the operation As far as the cortex itself goes since one of the purposes for which it actually exists is the production of new paths [5] the only question before us is is the formation of *these particular vicarious paths* too much to expect of its plastic powers? *It would certainly be too much to expect that a hemisphere should receive* currents from optic fibres whose *arriving place* within it is destroyed or that it should discharge into fibres of the pyramidal strand if their *place of exit* is broken down Such lesions as these must be irreparable *within that hemisphere* Yet even then through the other hemisphere the *corpus callosum* and the bilateral connections *in the spinal cord one can imagine some road by which* the old muscles might eventually be innervated by the same incoming cur rents which innervated them before the block And for all minor interruptions not involving the arriving place of the cortico petal or the place of exit of the cortico fugal fibres roundabout paths of some sort through the affected

[1] François Franck *op cit* p 382 *Results are somewhat contradictory*

[2] *Pflüger's Archiv* vol 42 p 419

[3] *Neurologisches Centralblatt* 1889 p 372

[4] *Op cit* p 387 See pp 378 88 *for a discussion of the whole question* Compare also

hemisphere itself must exist for every point of it is remotely at least in potential communication with every other point The normal paths are only paths of least resistance If they get blocked or cut paths formerly more resistant become the least resistant paths under the changed conditions. It must never be forgotten that a current that runs in has got to run out *somewhere* and if it only once succeeds by accident in striking into its old place of exit again the thrill of satisfaction which the consciousness connected with the whole residual brain then receives will reinforce and fix the paths of that moment and make them more likely to be struck into again. The resultant feeling that the old habitual act is at last successfully back again becomes itself a new stimulus which stamps all the existing currents in It is matter of experience that such feelings of successful achievement do tend to fix in our memory whatever processes have led to them and we shall have a good deal more to say upon the subject when we come to the chapter on the will

My conclusion then is this that some of the restitution of function (especially where the cortical lesion is not too great) is probably due to genuinely vicarious function on the part of the centres that remain whilst some of it is due to the passing off of inhibitions In other words both the vicarious theory and the inhibition theory are true in their measure But as for determining that measure or saying which centres are vicarious and to what extent they can learn new tricks that is impossible at present.

Final Correction Of The Meynert Scheme

And now after learning all these facts, what are we to think of the child and the candle-flame and of that scheme which provisionally imposed itself on our acceptance after surveying the actions of the frog? (*Cf* pp 16–17 *supra*) It will be remembered that we then considered the lower centres *en masse* as machines for responding to present sense-impressions exclusively and the hemispheres as equally exclusive organs of action from inward considerations or ideas and that following Meynert we supposed the hemispheres to have no native tendencies to determinate activity but to be merely superadded organs for breaking up the various reflexes performed by the lower centres and combining their motor and sensory elements in novel ways It will also be remembered that I prophesied that we should be obliged to soften down the sharpness of this distinction after we had completed our survey of the farther facts The time has now come for that correction to be made.

Wider and completer observations show us both that the lower centres are more spontaneous and that the hemispheres are more automatic, than the Meynert scheme allows Schrader's observations in Goltz's laboratory on hemisphereless frogs and pigeons give an idea quite different from the picture of these creatures which is classically current. Steiner's[1] observations on frogs already went a good way in the same direction showing for example that locomotion is a well-developed function of the medulla oblongata. But Schrader by great care in the operation and by keeping the frogs a long time alive found that at least in some of them the spinal cord would produce movements

P[flü]ger's Archiv vol. 4[1] p [7]5 ([1]887) *Ibid* vol. 44, p. [1]75 ([1]889)

[1] *Untersuchungen über die Physiologie des Froschhirns* [1]885

of locomotion when the frog was smartly roused by a poke and that swimming and croaking could sometimes be performed when nothing above the medulla oblongata remained[1] Schrader's hemisphereless frogs moved spontaneously ate flies buried themselves in the ground and in short did many things which before his observations were supposed to be impossible unless the hemispheres remained Steiner[2] and Vulpian have remarked an even greater vivacity in fishes deprived of their hemispheres Vulpian says of his brainless carps[3] that three days after the operation one of them darted at food and at a knot tied on the end of a string holding the latter so tight between his jaws that his head was drawn out of water Later *they see morsels of white of egg* the moment these sink through the water in front of them they follow and seize them sometimes after they are on the bottom sometimes before they have reached it In capturing and swallowing this food they execute just the same movements as the intact carps which are in the same aquarium The only difference is that they seem to see them at less distance seek them with less impetuosity and less perseverance in all the points of the bottom of the aquarium but they struggle (so to speak) sometimes with the sound carps to grasp the morsels It is certain that they do not confound these bits of white of egg with other white bodies small pebbles for example which are at the bottom of the water The same carp which three days after operation seized the knot on a piece of string no longer snaps at it now but if one brings it near her she draws away from it by swimming backwards before it comes into contact with her mouth[4] Already on pp 5–6 as the reader may remember we instanced those adaptations of conduct to new conditions on the part of the frog s spinal cord and thalami which led Pfluger and Lewes on the one hand and Goltz on the other to locate in these organs an intelligence akin to that of which the hemispheres are the seat

When it comes to birds deprived of their hemispheres the evidence that some of their acts have conscious purpose behind them is quite as persuasive In pigeons Schrader found that the state of somnolence lasted only three or four days after which time the birds began indefatigably to walk about the room *They climbed out of boxes in which they were put jumped over or flew* up upon obstacles and their sight was so perfect that neither in walking nor flying did they ever strike any object in the room They had also definite ends or purposes flying straight for more convenient perching places when made uncomfortable by movements imparted to those on which they stood and of several possible perches they always chose the most convenient If we give the dove the choice of a horizontal bar [*Reck*] or an equally distant table to fly to she always gives decided preference to the table Indeed she chooses the table even if it is several meters farther off than the bar or the chair Placed on the back of a chair *she flies first to the seat and then to the floor and in* general will forsake a high position although it give her sufficiently firm support and in order to reach the ground will make use of the environing ob

[1] *Loc c t* pp 80 82–83 Schr der als f un l a *b t g* refle de eloped when th medulla

[2] p 90

[4] *Comptes rend s* vol 102 p 1530

jects as intermediate goals of flight showing a perfectly correct judgment of their distance Although able to fly directly to the ground she prefers to make the journey in successive stages Once on the ground she hardly ever rises spontaneously into the air

Young rabbits deprived of their hemispheres will stand run start at noises avoid obstacles in their path and give responsive cries of suffering when hurt. Rats will do the same and throw themselves moreover into an attitude of de- f[illegible] never survive such an operation if performed at once But Goltz s [illegible] d to have been kept alive for fifty [illegible]

[illegible]

tions make out a prett good [illegible] plied to these lower animals That scheme demands hemispheres which shall be mere supple- [illegible] d in the light of these observations they ob- [illegible] d that [illegible] utely sure that some of those [illegible] been acquired after the injury and it furthermore demands that they should be machine-like whereas the expression of some of them makes us doubt whether [illegible] ell gence of low degree

[illegible]

but the latter resemble the former in [illegible] at least of spontaneity and choice

But when we come to monkeys and man the scheme well nigh breaks down altogether for we find that the hemispheres do not simply repeat voluntarily actions which the lower centres perform as machines There are many functions which the lower centres cannot by themselves perform at all When the motor cortex is injured in a man or a monkey genuine paralysis ensues which [illegible] incurable and almost or quite equally so in the ape Dr Seguin knew [illegible] persisted unaltered [illegible] ly account for [illegible] due to the loss of [illegible] essential organ It would seem [illegible] her creatures the lower centres must be less adequate than they are farther down in the zoological scale and that even for certain elementary combinations of movement and impression the co-operation of the hemispheres is necessary from the start Even in birds and dogs the power of *eating properly* is lost when the frontal lobes are cut off

The plain truth is that neither in man nor beast are the hemispheres the virgin organs which our scheme called them So far from being unorganized at

Loc cit p 6
Goltz in P [illegible] Schrad [illegible] It is possible that this symptom may be [illegible] ffect [illegible] inhibit [illegible] h were

of locomotion when the frog was smartly roused by a poke and that swimming and croaking could sometimes be performed when nothing above the medulla oblongata remained [1] Schrader s hemisphereless frogs moved spontaneously ate flies buried themselves in the ground and in short did many things which before his observations were supposed to be impossible unless the hemispheres remained Steiner[2] and Vulpian have remarked an even greater vivacity in fishes deprived of their hemispheres Vulpian says of his brainless carps[3] that three days after the operation one of them darted at food and at a *knot tied on the end of a string holding the latter so tight between his jaws* that his head was drawn out of water Later they see morsels of white of egg the moment these sink through the water in front of them they follow and seize them *sometimes after they are on the bottom sometimes before they have* reached it In capturing and swallowing this food they execute just the same movements as the intact carps which are in the same aquarium The only difference is that they seem to see them at less distance seek them with less impetuosity and less perseverance in all the points of the bottom of the aquarium but they struggle (so to speak) sometimes with the sound carps to grasp the morsels It is certain that they do not confound these bits of white of egg with other white bodies small pebbles for example which are at the bottom of the water The same carp which three days after operation seized the knot on a piece of string no longer snaps at it now but if one brings it near her she draws away from it by swimming backwards before it comes into contact with her mouth [4] Already on pp 5–6 as the reader may remember we instanced those adaptations of conduct to new conditions on the part of the frog s spinal *cord and thalami which led Pfluger and Lewes on the one hand and Goltz on* the other to locate in these organs an intelligence akin to that of which the hemispheres are the seat

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[illegible] d when the medulla

[4] *Comptes rend s vol 02 p 1530*

birds answer the courting of the male A hemisphereless male will coo all day long and show distinct si ns of sexual excitement but his activity is without any object it is entirelv indifferent to him whether the she-bird be there or If one is placed near him he lea es her unnoticed As the male pays her young The brood may fol they mi ht as well ask it from the highest degree tame and

flections which we have been through it eems to me that *we ca r* *r hold strictly to the Meynert* — w ll appl to the lowest animals but in them espe- ree of spontaneity and choice On ubstitute for it some such general conception as the following which allows f r zoological differences as we know them and is vague and elastic enough to receive any number of future discov eries of detail

Conclusion

All the centres in all animals whilst they are in one aspect mechanisms probably are or at least once were organs of consciousness in another al though *the consciousness is doubtless much more developed in the hemi spheres than it is anywhere else* The consciousness must everywhere *prefer* some of the sensations which it gets to others and if it can remember these in their absence however dimly they must be its *ends* of desire If moreover it can dentify in memory any motor discharges which may have led to such ends and associate the latter with them then these motor discharges them sel es may in turn become desired as *means* This is the development of *will*

t

All nervous centres have then in the first instance one essential function that of intell gent action They feel prefer one thing to another and have ends Like all other organs however they *evolve* f om ancestor to descend ant and their evolution takes two directions the lower centres passing down

Pfl g r A hiv 1 44 p 30–3

h *Ak d m St g b* 885 p o) th i est gati th simpl flexes f th frog rd sh w that there som d ptat t ew diti ns a m ch when us al path f nd u re int rrupted by cut w paths re tak A din to R se bal these gr w more perv us (equire mall tim t) in p porti as th y m re ft ra rsed.

birth they must have native tendencies to reaction of a determinate sort[1] These are the tendencies which we know as *emotions* and *instincts* and which we must study with some detail in later chapters of this book Both instincts and emotions are reactions upon special sorts of objects of *perception* they depend on the hemispheres and they are in the first instance reflex that is they take place the first time the exciting object is met are accompanied by no forethought or deliberation and are irresistible But they are modifiable to a certain extent by experience and on later occasions of meeting the exciting object, the instincts especially have less of the blind impulsive character which they had at first All this will be explained at some length in Chapter xxiv Meanwhile we can say that the multiplicity of emotional and instinctive reac tions in man together with his extensive associative power permit of exten sive recouplings of the original sensory and motor partners The *consequences* of one instinctive reaction often prove to be the inciters of an opposite reac tion and being *suggested* on later occasions by the original object may then suppress the first reaction altogether just as in the case of the child and the flame For this education the hemispheres do not need to be *tabulæ rasæ* at first as the Meynert scheme would have them and so far from their being educated by the lower centres exclusively they educate themselves[2]

We have already noticed the absence of reactions from fear and hunger in the ordinary brainless frog Schrader gives a striking account of the instinctless condition of his brainless pigeons, active as they were in the way of locomo tion and voice The hemisphereless animal moves in a world of bodies which are all of equal value for him He is to use Goltz s apt expression *impersonal* Every object is for him only a space-occupying mass he turns out of his path for an ordinary pigeon no otherwise than for a stone He may try to climb over both All authors agree that they never found any dif ference whether it was an inanimate body a cat a dog or a bird of prey which came in their pigeon s way The creature knows neither friends nor ene-mies in the thickest company it lives like a hermit The languishing cooing of the male awakens no more impression than the rattling of the peas or the call whistle which in the days before the injury used to make the birds hasten to be fed Quite as little as the earlier observers have I seen hemisphereless she-

[1] A few years ago one of the stronge t arguments for the theory that the hem spher re purely supernumerary was Soltmann s often quoted observation that in new born puppies [illegible] the co rse

at f rst voluntary becoming secondar ly utomatic and [illegible] a single orig nally refle act growing volu tarily As far as conscious rec d is concern d we could not poss bly have it even if the Meynert scheme were wholly t ue f r the ed c [illegible] lates must in the nature of things a t date [illegible] g s rejection of the scheme may p ss bly be [illegible] Everywhere in this department of psycl o-genesis we are made to feel how ig ora [illegible] lly re

Chapter III

ON SOME GENERAL CONDITIONS OF BRAIN ACTIVITY

THE elementary properties of nerve-tissue on which the brain functions depend are far from being satisfactorily made out The scheme that suggests itself in the first instance to the mind because it is so obvious is certainly false I mean the notion that each cell stands for an idea or part of an idea and that [illegible] ind into bundles (to use a phrase of Locke s)

[illegible]

nerve centres contain cells which [illegible] ized our diagram for us and that the mechanical substratum of thought is [illegible] In *some* way it is true our diagram must be realized in the brain but [illegible] [1] An enormous [illegible] here fibres are [illegible] nowhere do we see a simple coarse anatomical connection like [illegible] blackboard between two cells Too much anatomy has been found to order for theoretic purposes even by the anatomists and the popular science notions of cells and fibres are almost wholly wide of the truth Let us therefore relegate the subject of the [illegible] *t mate* workings of the brain to the physiology of the future save in respect to a few points of which a word must now be said And first of

The Summation of Stimuli

in the same nerve-tract Th s is a property extremely important for the understanding of a great many phenomena of the neural and consequently of the mental life and it behooves us to gain a clear conception of what it means befo e we proceed any farther

The law is this that *a st mulus wh ch would be inadequate by itself to excite a ner e cent e to effecti e discharge may by act ng with o e or more othe st muli (equally i effectual by themselves alone) bring the discharge about* The natural way to consider this is as a summation of tens ons which at last ove come a resistance The first of them produce a latent excitement or a he ghtened irr tability —the phrase is immaterial so far as pract cal consequences go the last is the straw wh ch breaks the camel s back Where the neural process is one that has consciousness for its accompaniment the final explos on would in all cases seem to involve a vivid state of feel ng of a more

[1] I [illegible] myself in l[illegible] places [illegible] schematization [illegible] will understand [illegible] symbolic [illegible] processes and mechanical processes [illegible] kind, [illegible]

wards into more unhesitating automatism and the higher ones upwards into larger intellectuality [1] Thus it may happen that those functions which can safely grow uniform and fatal become least accompanied by mind and that their organ the spinal cord becomes a more and more soulless machine whilst on the contrary those functions which it benefits the animal to have adapted to delicate environing variations pass more and more to the hemispheres whose anatomical structure and attendant consciousness grow more and more elaborate as zoological evolution proceeds In this way it might come about that in man and the monkeys the basal ganglia should do fewer things by themselves than they can do in dogs fewer in dogs than in rabbits fewer in rabbits than in hawks [2] fewer in hawks than in pigeons fewer in pigeons than in frogs fewer in frogs than in fishes and that the hemispheres should correspondingly do more This passage of functions forward to the ever enlarging hemispheres would be itself one of the evolutive changes to be explained like the development *of the hemispheres themselves either by fortunate variation or by inher*ited effects of use The reflexes on this view upon which the education of our human hemispheres depends would not be due to the basal ganglia alone They would be tendencies in the hemispheres themselves modifiable by education unlike the reflexes of the medulla oblongata pons optic lobes and spinal cord Such cerebral reflexes if they exist form a basis quite as good as that which the Meynert scheme offers for the acquisition of memories and associations which may later result in all sorts of changes of partners in the psychic world The diagram of the baby and the candle (see page 16) can be re edited if need be, as an entirely cortical transaction The original tendency to touch will be a cortical instinct the burn will leave an image in another part of the cortex which being recalled by association will inhibit the touching tendency the next time the candle is perceived and excite the tendency to withdraw—so that the retinal picture will upon that next time be coupled with the original motor partner of the pain We thus get whatever psychological truth the Meynert scheme possesses *without entangling ourselves on a dubious anatomy* and physiology

Some such shadowy view of the evolution of the centres of the relation of consciousness to them and of the hemispheres to the other lobes is it seems to me *that in which it is safest to indulge If it has no other advantage it at* any rate makes us realize how enormous are the gaps in our knowledge the moment we try to cover the facts by any one formula of a general kind

[1] Whether this evolution takes place through the inheritance of habits acquired or through the preservation of lucky variations is an alternative which we need not discuss here We shall consider it in the last chapter in the book For our present purpose the *modus operandi* of the evolution makes no difference provided it be admitted to occur

[2] See Schrader s *Observations loc cit*

...n of certain parts of the body is exposed to gentle tactile stimulation. If having ascertained the subminimal strength of current and convinced one's self repeatedly of its inefficacy, we draw our hand a single time lightly over the skin of the paw whose cortical centre is the object of stimulation, we find the current at once strongly effective. The increase of irritability lasts some seconds before it disappears. Sometimes the effect of a single light stroking of the paw is only sufficient to make the previously ineffectual current produce a very weak contraction. Repeating the tactile stimulation will then, as a rule, increase the contraction's extent.

We constantly use the summation of stimuli in our practical appeals. If a car-horse balks, the final way of starting him is by applying a number of customary incitements at once. If the driver uses reins and voice, if one bystander pulls at his head, another lashes his hind quarters, and the conductor rings the bell, and the dismounted passengers shove the car, all at the same moment, his obstinacy generally yields, and he goes on his way rejoicing. If we are trying to remember a lost name or fact, we think of as many 'cues' as possible, so that by their joint action they may recall what no one of them can recall alone. The sight of a dead prey will often not stimulate a beast to pursuit, but if the sight of movement be added to that of form, pursuit occurs. Brücke noted that his brainless hen, which made no attempt to peck at the grain under her very eyes, began pecking if the grain were thrown on the ground with force, so as to produce a rattling sound.[1] "Dr. Allen Thomson hatched out some chickens on a carpet, where he kept them for several days. They showed no inclination to scrape ... but when Dr. Thomson sprinkled a little gravel on the carpet, ... the chickens immediately began their scraping movements."[2] A strange person, and darkness, are both of them stimuli to fear and mistrust in dogs (and for the matter of that, in men). Neither circumstance alone may awaken outward manifestations, but together, i.e., when the strange man is met in the dark, the dog will be excited to violent defiance. Street hawkers well know the efficacy of summation, for they arrange themselves in a line upon the sidewalk, and the passer often buys from the last one of them, through the effect of the reiterated solicitation, which he refused to buy from the first in the row. Aphasia shows many examples of summation. A patient who cannot name an object simply shown him will name it if he touches as well as sees it, etc.

Instances of summation might be multiplied indefinitely, but it is hardly worth while to forestall subsequent chapters. Those on Instinct, the Stream of Thought, Attention, Discrimination, Association, Memory, Æsthetics, and

Archiv f. d. g. Physiol., vol. 5, p. ...5 (18..). Exner thinks (ibid., vol. 8, p. 497 (18..)) that the summation here occurs in the spinal cord. It makes no difference where this particular summation occurs, so far as the general philosophy of summation goes.

G. H. Lewes, Physical Basis of Mind, p. 4.9, where many similar examples are given, 4...–8... Romanes, Mental Evolution in Animals, p. 63.

See a similar instance in Mach, Beitr. z. Anal. der Empfindungen, p. 35 ... row being the animal. My young children are afraid of their own pug-dog when he enters their room after they are in bed and the lights are out. Compare this statement also: "The first ... ... statements

Dumb Friend ... ...

Dumb Friends' ... ... 843 p. 4...

or less substantive kind But there is no ground for supposing that the tensions whilst yet submaximal or outwardly ineffective may not also have a share in determining the total consciousness present in the individual at the time In later chapters we shall see abundant reason to suppose that they do have such a share and that without their contribution the fringe of relations which is *at every moment a vital ingredient of the mind s object would not come to* consciousness at all

The subject belongs too much to physiology for the evidence to be cited in detail in these pages I will throw into a note a few references for such readers as may be interested in following it out [1] and simply say that the direct electrical irritation of the cortical centres sufficiently proves the point For it was found by the earliest experimenters here that whereas it takes an exceed ingly strong current to produce any movement when a single induction shock is used a rapid succession of induction shocks (faradization) will produce movements when the current is comparatively weak A single quotation from an excellent investigation will exhibit this law under further aspects

If we continue to stimulate the cortex at short intervals with the strength of cur rent which produces the minimal muscular contraction [of the dog s digital extensor muscle] the amount of contraction gradually increases till it reaches the maximum Each earlier stimulation leaves thus an effect behind it which increases the efficacy of

I

vokes the first beginnin of contraction a very large number of successive shocks may *be needed before the movement appears— o 50 once 106 shocks were needed* 2) The summation takes place easily in proportion to the shortness of the interval between the stimuli A current too weak to give effective summation when its shocks are 3 ec onds apart will be capable of so doing when the interval is shortened to 1 second 3) Not only electrical irritation leaves a modification which goes to swell the following stimulus but every sort of irritant which can produce a contraction does so If in any way a reflex contraction of the muscle experimented on has been produced or if it is contracted spontaneously by the animal (as not unfrequently happens by sympathy during a deep inspiration) it is found that an electrical stimulus until then inopera tive operates energetically if immediately applied [2]

Furthermore

In a certain stage of the morphia narcosis an ineffectively weak shock will become powerfully effective if immediately before its application to the motor centre the

[1] Valent n *A cl v f d g s mt Phys ol* 1873 p 458 Stirling Leip g Acad *Ber chte* 1875 p 372 (*Journ l of Physiol* 1875) J Ward *A ch v f (A at u) Phy ol* 1880 p 72 H Sewall *Joh s Hopki s Stud s* 1880 p 30 Kron cker u Nicolaid s *A cl v f (An t u) Phys ol* 188 p 437 Exner *Arch v f d e ges Phys ol* vol 28 p 487 (1882) Eckha d in Hermann s *Hdbch d Phys ol* vol 1 pt II p 31 François Franck *Fo ctions n otric s du cerveau* p 51 ff 339 —For the process of summ tion in *erves* d *muscles cf* Hermann *bid* pt 1 pp 109 a d vol 1 p 40 Also Wundt *Phys l Psych* 1 p 243 ff Richet *Tr vaux du l bo ato e de Ma ey* 1877 p 97 *L Homme et I i tell ge ce* pp 24 ff 468 *Revue Ph losoph q e* vol XXI p 564 Kron cker u *H ll* In *A ch v f (Anat u)* ol in Hofmann and Schwalbe s *Jahr s Cent albl tt* 1883 No 7 Grünh gen

Hemmungsi g ge erhalb de mo ol 26 p 156 (1881)

Fig. 21B where the line is broken by the signal at the first arrow and continued again by the reaction at the second Ludwig's kymograph and Marey's chronograph are good examples of this type of instrument

Another type of instrument is represented by the stopwatch of which the most perfect form is Hipp's Chronoscope The hand on the dial measures intervals as short as $\frac{1}{1000}$ of a second The signal (by an appropriate elec

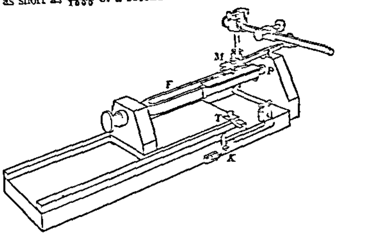


Fig. B wditch reactio -timer F tuning f rk carri... little plat w..ich h lds th pape which th electric pen M makes th tracin.. and sliding in grooves n t.. base board. P pl... which spreads the prongs f th f rk part when it is pus..ed f rward to its extrem limit, a..d releases them when t is drawn back t certain point. Th f k t.. vi rates and ts backward m vement co tinuin an undulatin.. line is drawn t.. smoked paper by th pen At T is t ngu fixed t t.. carria f th f rk, a..d t K an ..ectri key which th tongue pens and with which th electric pen is connected. At th i..stant f opening t.. pen cha..ges its place and th und..lating l... is drawn t differ ent level t.. pape Th ...eni..., can be mad t serve a signal t th reacter in variet f ways and his reacti n can be mad to close th pe ...un. when th line returns ts first level. Th reacti time=th numbe f undulations traced t t..e seco d level.

tric connection) starts it the reaction stops it and by reading off its initial and terminal positions we have immediately and with no farth r trouble the

works very well

The manner in which the signal and reaction are connected with the chronograph c apparatus varies indefinitely in different experiments. Every new problem requires some new electric or mechanical disposition of apparatus

The least compl cated time-measurement is that known as *s mple reaction time* in wh ch there is but one pos ible signal and one pos ible movement, and both are known in ad ance The movement is generally the closing of an elec tric key with the hand. The foot the jaw the lips even the evelid have been

The reader will find great deal bout chronographic pparatus in J Marey *La*

Jastrow See Science f September o, 55

Will will contain numerous exemplifications of the reach of the principle in the purely psychological field

Reaction Time

One of the lines of experimental investigation most diligently followed of late years is that of the ascertainment of the *time occupied by nervous events* Helmholtz led off by discovering the rapidity of the current in the sciatic nerve of the frog But the methods he used were soon applied to the sensory nerves and the centres and the results caused much popular scientific admiration when described as measurements of the velocity of thought The phrase quick as thought had from time immemorial signified all that was wonderful and elusive of determination in the line of speed and the way in which Science laid her doomful hand upon this mystery reminded people of the day when Franklin first *eripuit cœlo fulmen* foreshadowing the reign of a newer and colder race of gods We shall take up the various operations measured each in the chapter to which it more naturally pertains I may say however immedi ately that the phrase velocity of *thought* is misleading for it is by no means clear in any of the cases what particular act of thought occurs during the time which is measured Velocity of nerve action is liable to the same criticism for in most cases we do not know what particular nerve processes occur What the times in question really represent is the total duration of certain *reactions upon stimuli* Certain of the conditions of the reaction are prepared beforehand they consist in the assumption of those motor and sensory tensions which we name the expectant state Just what happens during the actual time occupied by the reaction (in other words just what is added to the pre existent tensions to produce the actual discharge) is not made out at present either from the neural or from the mental point of view

The method is essentially the same in all these investigations A signal of some sort is communicated to the subject and at the same instant records it self on a time registering apparatus The subject then makes a muscular movement of some sort which is the reaction and which also records itself automatically The time found to have elapsed between the two records is the

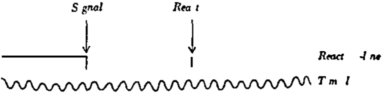


FIG 21B

total time of that observation The time registering instruments are of various types One type is that of the revolving drum covered with smoked paper on which one electric pen traces a line which the signal breaks and the reaction draws again whilst another electric pen (connected with a pendulum or a rod of metal vibrating at a known rate) traces alongside of the former line a time-line of which each undulation or link stands for a certain fraction of a second and against which the break in the reaction line can be measured Compare

taken up by this psycho-physical stage No 3 would be to determine separately
h several purely physical processes 1 2 4 and 5 and to sub-
been made [1] But
lt himself ad
veloped with

mits [2] the precise duration of ... 3 ...
that of the other processes in the total reaction time

My own belief is that no such succession of conscious feelings as Wundt describes takes place during stage 3 It is a process of central excitement and discharge with which doubtless some feeling coexists but *what* feeling we can not tell because it is so fugitive and so immediately eclipsed by the more sub... m mory of the impression as it came in and of the exe-
ht
ss
fi
its

ntely long r time But these other conditions ...
we are discussing and it is mythological psychology (of which we shall see many later examples) to conclude that because two mental processes lead to the same result they must be similar in their inward subjective constitution The feeling of stage 3 is certainly no articulate perception. It can be nothing but the mere sense of a reflex discharge *The reaction whose time is measured is in short a reflex action pure and simple and not a psychic act* A foregoing psychic condition is it is true a prerequisite for this reflex action The preparation of the attention and volition the expectation of the signal and the readiness of the hand to move the instant it shall come the nervous tension in which the subject waits are all conditions of the formation in him for the time being of a new path or arc of reflex discharge The tract from the sense-organ which receives the stimulus into the motor centre which discharges the reaction is already tingling with premonitory innervation is raised to such a pitch of
t

times responds to a *wrong signal* especially if it be an impression of the same kind with the signal we expect But if by chance we are tired or the signal is unexpectedly weak and we do not react instantly but only after an express perception that the signal has come and an express volition the time becomes quite disproportionately long (a second or more according to Exner[4]) and we feel that the process is in nature altogether different.

In fact the reaction time experiments are a case to which we can immedi

By Exner for example *Pflüger's Archiv* VII, p 6 8 ff
P *Cf* also Richet, in *Rev Philo* VI, pp 395–96
F instance if th previous day had resolved t ct signal wh n t h ld ... d t w came whilst w were engaged in ther things, d reminded us f th resolve.

I need hardl mention that success in these experiments depends in high degree ur concentration f ttention. If inattentive, ne gets very discrepant figures. This concentration f the tention is in th highest degree xh usting. After some experim s in which I was co cerned t get results as unif rm as possibl I was co ered with perspiration and excessively f tigued although I had sat quietly in my chair ll th while (Exner *loc cit* VII, p. 6 8.) Wundt, *Physiol Psych* II, p 6 *Pflüger's Archiv* VII, p 6 6

in turn made organs of reaction and the apparatus has been modified accordingly [1] The time usually elapsing between stimulus and movement lies between one and three tenths of a second, varying according to circumstances which will be mentioned anon

The subject of experiment whenever the reactions are short and regular is in a state of extreme tension and feels when the signal comes as if *it* started the reaction by a sort of fatality and as if no psychic process of perception or volition had a chance to intervene The whole succession is so rapid that perception seems to be retrospective and the time order of events to be read off in memory rather than known at the moment This at least is my own personal experience in the matter and with it I find others to agree The question is What happens inside of us either in brain or mind? and to answer that we must analyze just what processes the reaction involves It is evident that some time is lost in each of the following stages

1 The stimulus excites the peripheral sense organ adequately for a current to pass into the sensory nerve

2 The sensory nerve is traversed

3 The transformation (or reflection) of the sensory into a motor current occurs in the centres

4 The spinal cord and motor nerve are traversed

5 The motor current excites the muscle to the contracting point

Time is also lost of course outside the muscle in the joints skin etc and between the parts of the apparatus and when the stimulus which serves as signal is applied to the skin of the trunk or limbs time is lost in the sensorial conduction through the spinal cord

The stage marked 3 is the only one that interests us here The other stages answer to purely physiological processes but stage 3 is psycho physical that is it is a higher central process and has probably some sort of consciousness accompanying it What sort?

Wundt has little difficulty in deciding that it is consciousness of a quite elaborate kind He distinguishes between two stages in the conscious reception of an impression calling one *perception* and the other *apperception* and likening the one to the mere entrance of an object into the periphery of the field of vision and the other to its coming to occupy the focus or point of view *Inattentive awareness* of an object, and *attention to it* are it seems to me *equivalents for* perception and apperception as Wundt uses the words To these two forms of awareness of the impression Wundt adds the conscious volition to react gives to the trio the name of psycho physical processes and assumes that they actually follow upon each other in the succession in which they have been named [2] So at least I understand him The simplest way to determine the time

[illegible] ...nfe s to f nd

I see n use whatever for the word as he employs it in Psychology Atte tion pe c pt on conception volition are its ample equivalents Why we should need a s gle wo d to d ote all these things by turns Wundt f l t mak cle Consult ho e r l is p p l Sta de s article Über den Begriff der App cept o etc in Wundt s p dical *Philo oph che St d n* 1 p 149 which may be supposed off c al For a minute c t ci m of Wu dt s apperc ption see Marty in *Vierteljah sch ft f u s Ph los* x p 346

ways of settin, the attention in reacting on a signal and who found that they ... *extreme sensorial* way as Lange calls ...

the *extreme muscular* way ... stands as ready as possible for the movement The muscular reactions ... much shorter than the sensorial ones the avera e difference being in the neighbo hood of a tenth of a second Wundt accordingly calls them shortened reactions and with Lange admits them to be mere reflexes whilst the sen ... and holds to his original conception as far ...

act in the extreme sensorial way ... that they must be rejected from the count as non typical Only after the reacter has succeeded by repeated and conscientious practice in bringin about an extremely precise co-ordination of his voluntary impulse with his sense impression do we get times which can be regarded as typical sensorial reaction times Now it seems to me that these excessive and untypical times are probably the real complete times the only ones in which distinct processes of actual percept on and olition occur (see above pp 58–59) The typical sensorial time which is attained by practice is probably another sort of reflex less perfect than the reflexes prepared by strainin one s attention towards the movement The times are much more variable in the sensorial way than in the muscular The several muscular reactions differ little from each other Only n them does the phenomenon occur of reacting on a false signal or of react n before the signal Times intermediate between these two types occur according as the attention fails to turn itself exclus ely to one of the extremes ... n between the two types of reaction is ... od giving both ... aimed at in all comparati e invest gations Herr Lan e s own muscular time averaged 0 123 h s ensorial time 0 230

These reaction time experiments are then in no sense measurements of the swiftness of *thought* Only when we complicate them is there a chance for anything l'ke an intellectual operation to occur They may be compl cated in various ways The react on may be withheld until the signal has consciously awakened a d stinct idea (Wundt s discrimination time association time) and then performed Or there may be a variety of possible signals each with a different eact on assigned to it and the reacter may be uncertain which one he is about to receive The reaction would then hardly seem to occur without a prelim nary recogn t on and cho ce We shall see howeve in the appropriate chapters that the discrimination and choice in olved in such a reaction are widely different from the intellectual operations of which we are ord narily conscious under those names Meanwhile the simple reaction time remains as the startin point of all these superinduced complicat ons It is the fundamental

Loc cit p 483 *Loc cit* p 487 *Lo cit* p 489

Lang has int resti g hypothesis as t th brain p ocess co rned in th latte f which I can nly ref t his essay

ately apply what we have just learned about the summation of stimuli I expectant attention is but the subjective name for what objectively is a partial stimulation of a certain pathway the pathway from the centre for the signal to that for the discharge In Chapter XI we shall see that all attention involves excitement from within of the tract concerned in feeling the objects to which attention is given The tract here is the excito motor arc about to be traversed The signal is but the spark from without which touches off a train already laid The performance under these conditions exactly resembles any reflex action The only difference is that whilst in the ordinarily so called reflex acts the reflex arc is a permanent result of organic growth it is here a transient result of previous cerebral conditions[1]

I am happy to say that since the preceding paragraphs (and the notes thereto appertaining) were written Wundt has himself become converted to the view which I defend He now admits that in the shortest reactions there is neither apperception nor will but that they are merely *brain reflexes due to practice*[2] The means of his conversion are certain experiments performed in his laboratory by Herr L Lange[3] who was led to distinguish between two

[1] In short what M Delbœuf calls an *organe adventice* The reaction time moreover is quite compatible with the reaction itself being of a reflex order Some reflexes (sneezing e g) are very slow The only time measurement of a reflex act in the human subject with which I am acquainted is Exner's measurement of winking (in *Pflüger's Archiv* vol VIII p 526 1874) He found that when the stimulus was a flash of light it took the wink 0 2168 sec to occur A strong electric shock to the cornea shortened the time to 0 0578 sec The ordinary reaction time is midway between these values Exner reduces his times by eliminating the physiological process of conduction His reduced minimum winking time is then 0 0471 (*ibid* p 531) whilst his reduced reaction time is 0 0828 (*ibid* VII p 637) These figures have really no scientific value beyond that of showing according to Exner's own belief (VII p 531) that reaction time and reflex time measure processes of essentially the same order His description moreover of the process is an excellent description of a reflex act Every one says he who makes reaction time experiments for the first time is surprised to find how little he is master of his own movements so soon as it becomes a question of executing them with a maximum of speed Not only does their energy lie as it were outside the field of choice but even the time in which the movement occurs depends only partly upon ourselves We jerk our arm and we can afterwards tell with astonishing precision whether we have jerked it quicker or slower than another time although we have no power to jerk it exactly at the wished for moment Wundt himself admits that when we await a strong signal with tense preparation there is no consciousness of any duality of apperception and motor response the two are continuous (*Physiol Psych* II p 226) Mr Cattell's view is identical with the one I defend I think he says that if the processes of perception and willing are present at all they are very rudimentary The subject by a voluntary effort [before the signal comes] puts the lines of communication between the centre for the stimulus and the centre for the co ordination of motions in a state of unstable equilibrium When therefore a nervous impulse reaches the former centre it causes brain changes in two directions an impulse moves along to the cortex and calls forth there a perception corresponding to the stimulus while at the same time an impulse follows

c ous pc ception or c n c us v ll

[2] *Physiol Psych* 3d edition (1887) vol II p 266

[3] *Philosophische Studien* vol IV p 479 (1888)

They are slow a eraging about half a second (cf Beaunis *Recherches exp sur l'activité cérébrale* 1884 p 49 ff)

It will be observed that *sou d* is more promptly reacted on than either *s ght* or *touch* *Tas e* and *smell* are lower than either One individual who reacted to touch upon the tip of the tongue in o 1 5 took o 993 to react upon the taste of quinine applied to the same spot In another upon the base of the tongue the reaction to touch being o 141 that to sugar was o 552 (Vintschgau quoted by Buccola p 103) Buccola found the reaction to odors to vary from o 334 to o 681 according to the perfume used and the individual

m kes a difference The intenser the stimulus

and the subject u c

foot always went quickest When the sound kin of the foot was touch u

of the corn it was the hand which always reacted first. Wundt tries to how that when the signal is made barely perceptible the time is probably the same *in all the senses namely about o 332 (Physiol Psych 2d ed., II p 224)*

Where the signal is of touch the place to which it is applied makes a difference in the resultant reaction time G S Hall and V Kries found (*A chiv f [A at u] Physiol* 1879) that when the finger tip was the place the reaction was horter than when the middle of the upper arm was used in spite of the greater length of nerve-trunk to be traversed in the latter case This discovery invalidates the measurements of the rapidity of transmission of the current in human nerves for they are all based on the method of comparin reaction times from places near the root and near the extremity of a limb The same observers found that signals een by the periphery of the retina gave lon er times than the same gnals seen by direct vision

The *season* makes a difference the time bein some hundredths of a econd horter on cold winter days (Vintschgau *apud* Exner *Hermann s Hdbk* p

port of two German observers Dr J W alteu

m e thorough than any previous ones could find no very decided effects

Buccola p 189)

Certain *diseased states* naturally lengthen the time.

The *hyp o c t ance* has no constant effect sometimes shortening and sometimes lengthening it (Hall in *Mind* VIII p 170 James *P oc Am Soc. for Psych Research* p 246)

The time taken to *inh bit* a movement (e.g to cease contraction of jaw muscles) seems to be about the same as to produce one (Gad *Archiv f [Ana. u] Phys ol* [1887] p 468 Orchansky *bid* [1889 1885])

An immense amount of work has been done on reaction time of which I

phy siological constant in all time measurements As such its own variations have an interest and must be briefly passed in review [1]

The reaction time varies with the *individual* and his *age* An individual may have it particularly long in respect of signals of one sense (Buccola p 147) but not of others Old and uncultivated people have it long (nearly a second in an old pauper observed by Exner *Pfluger s Archiv* VII 612–14) Children have it long (half a second Herzen in Buccola p 152)

Practice shortens it to a quantity which is for each individual a minimum beyond which no farther reduction can be made The aforesaid old pauper s time was after much practice reduced to 0 1866 (*loc cit* p 626)

Fatigue lengthens it

Concentration of attention shortens it Details will be given in the chapter on Attention

The *nature of the signal* makes it vary [2] Wundt writes

> I found that the reaction time for impressions on the skin with electric stimulus is less than for true touch sensations as the following averages show

	A ag	A rage V t
Sound	0 167 sec	0 0221 sec
L ght	0 222	0 0219
El ctric skin sensation	0 201	0 0115
Touch sensat ons	0 213	0 0134

> I here bring together the averages which have been obtained by some other observers

	H h	H k l	E
Sound	0 149	0 1505	0 1360
Light	0 200	0 2246	0 1506
Skin sensation	0 182	0 1546	0 1337 [3]

Thermic reactions have been lately measured by A Goldscheider and by Vintschgau (1887) who *find them slower than reactions from touch* That from heat especially is very slow more so than from cold the differences (according to Goldscheider) depending on the nerve terminations in the skin

Gustatory reactions were measured by Vintschgau They differed according to the substances used running up to half a second as a maximum when identification took place The mere perception of the presence of the substance on the tongue varied from 0 159 to 0 219 (*Pfluger s Archiv* XIV p 529)

Olfactory reactions have been studied by Vintschgau Buccola and Beaunis

[1] The reader who wi hes t know m e about the matter will f nd a most faithful comp l ... Buccola s *Legge* ... in Hermann s ... VIII

[2] The nature of the movement also seems to make it va y Mr B I Gilman and I reacted to the s me s gnal by simply rais g our hand and again by carry ng our h nd towards ur back The moment registe ed was al ays that at which the han l broke an elect ic contact in *sta ti g* to move But it started one or tv o hu d edths of a second l ter whe the ... h ne to be m de O ch nsky on the other h nd e pe i ... *ol* ... the ... ter

They are slow averaging about half a second (cf Beaunis *Recherches exp sur l'activité cérébrale* 1884 p 49 ff) ... n omptly reacted on than either *sight* ...

tongue the reaction to touch ... schrau quoted by Buccola p 103) Buccola found the reaction to odors to vary from 0 334 to 0 681 according to the perfume used and the individual

The *intensity of the signal* makes a difference The intenser the stimulus the shorter the time Herzen (*Grundlinien einer allgem Psychophysiologie* p 101) compared the reaction from a *corn* on the toe with that from the skin of the hand of the same subject The two places were stimulated simultaneously and the subject tried to react simultaneously with both hand and feet but the foot always went quickest When the sound skin of the foot was touched instead of the corn it was the hand which always reacted first Wundt tries to show t ... nal is made barely perceptible the time is probably the same ...

(*Anat u*] *Physiol* 1879) that when ... was shorter than when the middle of the upper arm was used in spite of the greater length of nerve-trunk to be traversed in the latter case This discovery invalidates the measurements of the rapidity of transmission of the current in human nerves for they are all based on the method of comparing reaction times from places near the root and near the extremity of a limb The same observers found that signals seen by the periphery of the retina gave longer times than the same signals seen by direct vision

The *season* makes a difference the time being some hundredths of a second shorter on cold winter days (Vintschgau *apud* Exner *Hermann's Hdbh* p 270)

Intoxicants alter the time *Coffee* and *tea* appear to shorten it Small doses of *wine* and *alcohol* first shorten and then lengthen it but the shortening stage tends to disappear if a large dose be given immediately This at least is the report of two German observers Dr J W Warren whose observations are more thorough than any previous ones could find no very decided effects

Buccola p 189)

Certain *diseased states* naturally lengthen the time

The *hypnotic trance* has no constant effect sometimes shortening and sometimes lengthening it (Hall in *Mind* VIII p 170 James *Proc Am Soc for Psych Research* p 246)

The time taken to *inhibit* a movement (e.g to cease contraction of jaw muscles) seems to be about the same as to produce one (Gad *Arch v f* [*Anat*] *Physiol* [1887] p 468 Orchansky *ibid* [1889 1885])

An immense amount of work has been done on reaction time of which I

have cited but a small part It is a sort of work which appeals particularly to patient and exact minds and they have not failed to profit by the opportunity

Cerebral Blood Supply

The next point to occupy our attention is the *changes of circulation which accompany cerebral activity*

All parts of the cortex when electrically excited produce alterations both of respiration and circulation The blood pressure rises as a rule all over the body no matter where the cortical irritation is applied though the motor zone is the most sensitive region for the purpose Elsewhere the current must be strong enough for an epileptic attack to be produced [1] Slowing and quickening of the heart are also observed and are independent of the vaso constrictive phenomenon Mosso using his ingenious plethysmograph as an indicator discovered that the blood supply to the arms diminished during intellectual



FIG 23 Sphygmographic pulse tracing A during intellectual repose B during intellectual activity (Mosso)

activity and found furthermore that the arterial tension (as shown by the sphygmograph) was increased in these members (see Fig 23) So slight an emotion as that produced by the entrance of Professor Ludwig into the labora tory was instantly followed by a shrinkage of the arms [2] The brain itself is an excessively vascular organ a sponge full of blood in fact and another of Mosso s inventions showed that when less blood went to the arms more went to the head The subject to be observed lay on a delicately balanced table which could tip downward either at the head or at the foot if the weight of either end were increased The moment emotional or intellectual activity began in the subject down went the balance at the head end in consequence of the redis tribution of blood in his system But the best proof of the immediate afflux of blood to the brain during mental activity is due to Mosso s observations on three persons whose brain had been laid bare by lesion of the skull By means of apparatus described in his book [3] this physiologist was enabled to let the brain pulse record itself directly by a tracing The intra cranial blood pressure rose immediately whenever the subject was spoken to or when he began to think actively as in solving a problem in mental arithmetic Mosso gives in his work a large number of reproductions of tracings which show the instanta neity of the change of blood supply whenever the mental activity was quick

(1881) chap II The I trod c

tion gives the history of ur previous knowl dge of the subject

ened by any cause whatever intellectual or emotional He relates of his female subject that one day whilst tracing her brain pulse he observed a sudden rise with no apparent outer or inner cau e She however confessed to him afterwards that at that moment she had caught si ht of a *skull* on top of a piece of furniture in the room and that this had given her a slight emotion

The fluct h blood supply to the brain were independent of respiratory ch lmost im mediately ircula u h to tion follows the needs of the cerebral ac each reg on of the cortex according as it is most active but of this we know noth ng I need hardly say that the activity of the nervous matter is the pr mary phenomenon and the afflux of blood its secondary consequence Many popular writers talk as if it were the other way about and as if mental activity m of blood But as Professor H N Martin has well n d ctly on ns an which we have been considering doubtless as elaborate as that which adaptive reflex vaso-motor mechanism doubtless as elaborate as that which harmonizes blood supply with cell action in any muscle or gland

Of the chan es in the cerebral circulat on during sleep I will speak in the chapter which treats of that subject

Cerebral Thermometry

B ai -acti ty seems accompan ed by a local disengagement of heat The earl est careful work in this d rect on was by Dr J S Lombard in 1867 Dr Lombard s latest results include the record of over 60 000 observations He noted the changes in delicate thermometers and electric piles placed against the scalp in human bein s and found that any intellectual effort such as com put ng composing recitin poetry s lently or aloud and especially that emotional exc tement such as an an er fit caused a general rise of temperature which rarely exceeded a degree Fahrenhe t The rise was in most cases more ma ked in the middle region of the head than elsewhere Stran e to say it was greater in reciting poetry silently than in reciting it aloud Dr Lombard s explanat on is that in internal recitation an add tional portion of energy which in recitation aloud was converted into nervous and muscular force now ap-

s mple central process is to *speak* when we th nk to think silently involves a check in add tion In 1870 the indefatigable Schiff took up the subject experi

I this co lus M Gley (*A hi d Phys l g* [83] p 74) agrees with P fes so M sso Gl y f d his p lse rise 3 beats his ca tid dilat d his radial t y tract d nn h rd m t l w k

Address bef Med nd Chirurg Soci ty f M ryl d 879

See h book, *Exp rim tal R h th R g al T mper tur f th H d* (Lond n, 879) *Lo cit* p 95

menting on live dogs and chickens plunging thermo-electric needles into the substance of their brain to eliminate possible errors from vascular changes in the skin when the thermometers were placed upon the scalp After habituation was established he tested the animals with various sensations tactile optic olfactory and auditory He found very regularly an immediate deflection of the galvanometer indicating an abrupt alteration of the intra cerebral temperature When for instance he presented an empty roll of paper to the nose of his dog as it lay motionless there was a small deflection but when a piece of meat was in the paper the deflection was much greater Schiff concluded from these and other experiments that sensorial activity heats the brain tissue
but he did not try
both hemispheres
in 1880 made a fa
tary muscular contractions Applying a number of delicate surface thermometers simultaneously against the scalp he found that when different muscles of the body were made to contract vigorously for ten minutes or more different regions of the scalp rose in temperature that the regions were well focalized and that the rise of temperature was often considerably over a Fahrenheit degree As a result of his investigations he gives a diagram in which numbered regions represent the centres of highest temperature for the various special movements which were investigated To a large extent they correspond to the centres for the same movements assigned by Ferrier and others on other grounds only they cover more of the skull [2]

Phosphorus and Thought

Chemical action must of course accompany brain activity But little definite is known of its exact nature Cholesterin and creatin are both excrementitious products and are both found in the brain The subject belongs to chemistry rather than to psychology and I only mention it here for the sake of saying a word about a wide spread popular error about brain activity and phosphorus *Ohne Phosphor kein Gedanke* was a noted war cry of the materialists during the excitement on that subject which filled Germany in the sixties The brain like every other organ of the body contains phosphorus and a score of other chemicals besides Why the phosphorus should be picked out as its essence no one knows It would be equally true to say *Ohne Wasser kein Gedanke* or *Ohne Kochsalz kein Gedanke* for thought would stop as quickly if the brain should dry up or lose its NaCl as if it lost its phosphorus In America the phosphorus delusion has twined itself round a saying quoted (rightly or wrongly) from Professor L Agassiz to the effect that fishermen are more

would be to find whether more is excreted by the brain during mental activity than during rest Unfortunately we cannot do this directly but can only gauge

[1] The most convenie t ac ount f Schiff s e periments is by Prof Herzen i the *R v e philosoph que* vol III p 36

[2] *A New Study of C eb al Cortic l Locali t on* (N Y Putnam 1880) pp 48–53

the amount of PO₅ in the urine which represents other organs as well as the brain and this procedure as Dr Edes says is like measuring the rise of water at the mouth of the Mississippi to tell whether there has been a thunder storm in Minnesota It has been adopted however by a variety of observers some of whom found the phosphates in the urine diminished whilst others found them increased by intellectual work On the whole it is impossible to trace any constant relation In maniacal excitement less phosphorus than usual seems to be excreted More is excreted during sleep There are differences between the alkaline and earthy phosphates into which I will not enter as my only aim is to show that the popular way of looking at the matter has no exact foundation The fact that phosphorus preparations may do good in nervous exhaustion proves nothing as to the part played by phosphorus in mental activity Like iron arsenic and other remedies it is a stimulant or tonic, of whose intimate workings in the system we know absolutely nothing and which moreover does good in an extremely small number of the cases in which it is prescribed

The phosphorus philosophers have often compared thought to a secretion. The brain secretes thought as the kidneys secrete urine or as the liver secretes bile are phrases which one sometimes hears The lame analogy need hardly be pointed out The materials which the brain *pours into the blood* (cholesterin creatin xanthin or whatever they may be) are the analogues of the urine and the bile being in fact real material excreta As far as these matters go the brain is a ductless gland But we know of nothing connected with liver and kidney activity which can be in the remotest degree compared with

[1] *A[illegible] kr[illegible] f M dici* [illegible] ol x N[illegible] 1 (883)

Chapter IV

HABIT

When we look at living creatures from an outward point of view one of the first things that strike us is that they are bundles of habits In wild animals the usual round of daily behavior seems a necessity implanted at birth in animals domesticated and especially in man it seems to a great extent to be the result of education The habits to which there is an innate tendency are called instincts some of those due to education would by most persons be called acts of reason It thus appears that habit covers a very large part of life and that one engaged in studying the objective manifestations of mind is bound at the very outset to define clearly just what its limits are

The moment one tries to define what habit is one is led to the fundamental properties of matter The laws of Nature are nothing but the immutable habits which the different elementary sorts of matter follow in their actions and reactions upon each other In the organic world however the habits are more variable than this Even instincts vary from one individual to another of a kind and are modified in the same individual as we shall later see to suit the exigencies of the case The habits of an elementary particle of matter cannot change (on the principles of the atomistic philosophy) because the particle is itself an unchangeable thing but those of a compound mass of matter can change because they are in the last instance due to the structure of the compound and either outward forces or inward tensions can from one hour to another turn that structure into something different from what it was That is they can do so if the body be plastic enough to maintain its integrity and be not disrupted when its structure yields The change of structure here spoken of need not involve the outward shape it may be invisible and molecular as when a bar of iron becomes magnetic or crystalline through the action of certain outward causes or India rubber becomes friable or plaster sets All these changes are rather slow the material in question opposes a certain resistance to the modifying cause which it takes time to overcome but the gradual yielding whereof often saves the material from being disintegrated altogether When the structure has yielded the same inertia becomes a condition of its comparative permanence in the new form and of the new habits the body then manifests *Plasticity* then in the wide sense of the word means the possession of a structure weak enough to yield to an influence but strong enough not to yield all at once Each relatively stable phase of equilibrium in such a structure is marked by what we may call a new set of habits Organic matter especially nervous tissue seems endowed with a very extraordinary degree of plasticity of this sort so that we may without hesitation lay down as our first proposition the following that *the phenomena of habit in living beings are due to the plasticity*[1] *of the organic materials of which their bodies are composed*

But the philosophy of habit is thus in the first instance a chapter in physics

[1] In the sense above explained which applies to inner structure as well as to outer form

tion to analogues of acq i u n
Dumont whose essay on habit is perhaps the mo t philosophical a t
published writes

E ery e knows how a garme t after ha ing be n worn a certain time clings to the shape of the body better than when it was new there has been a chan e in the tissue and this change s a n w habit of cohes on A lock works better after be ng u ed some time at the outset mo e fo ce wa req i ed to o er ome certain rou hnesses in the mechanism The o e c ming of their r s stance is a phe ome n of hab tuat on It costs less tr uble to f ld a pape when it has been folded already This sa in of f h h t which brin s it about that to rep oduce

Not in the nervous system alone A scar anywhere is a sf
t hl to be abraded inflamed to suffer pain and cold than are the

each fresh recurrence more prone to a re ps
chronically substitutes itself for the sound one And if we ascend to the nervous system we find how many so-called funct onal diseases seem to keep them sel es going simply because they happen to have once begun and how the forcible cuttin ho t by medicine of a few attacks is often suffi cient to enable the phys ol gical forces to get possession of the field again and to bring the organs back to functions of health Epilepsies neural ias convulsive affec t ons of various sorts insomnias are so many cases in po nt And to take what are more obviously habits the success with which a weanin treat ment can often be applied to the victims of unhealthy indul ence of passion or of mere compla ning or irascible disposition shows us how much the morbid manifestations themselves were due to the mere inertia of the nervous organs when once launched on a false career

Can we now form a notion of what the inward physical chan es may be like in organs whose hab ts have thus struck into new paths? In other words can we say just what mechanical facts the e p ession change of hab t covers when it is appl ed to a nervous system? Certa nly we cannot in anything like a m n te or def n te way But our usual sc ent fic custom of interp etin hidden molecular e ents after the analogy of visible mass ve ones enables us to frame easily an abstract and general scheme of processes which the physical chan es in quest on *may* be l ke And when once the possib l ty of *some* kind of mechan

[1] R ue phil ph g 1, p 324

ical interpretation is established mechanical science in her present mood will not hesitate to set her brand of ownership upon the matter feeling sure that it is only a question of time when the exact mechanical explanation of the case shall be found out

If habits are due to the plasticity of materials to outward agents we can immediately see to what outward influences if to any the brain matter is plastic Not to mechanical pressures not to thermal changes not to any of the forces to which all the other organs of our body are exposed for nature has carefully shut up our brain and spinal cord in bony boxes where no influences of this sort can get at them She has floated them in fluid so that only the severest shocks can give them a concussion and blanketed and wrapped them about in an altogether exceptional way The only impressions that can be made upon them are through the blood on the one hand and through the sensory nerve roots on the other and it is to the infinitely attenuated currents that pour in through these latter channels that the hemispherical cortex shows itself to be so peculiarly susceptible The currents once in must find a way out In getting out they leave their traces in the paths which they take The only thing they *can* do in short is to deepen old paths or to make new ones and the whole plasticity of the brain sums itself up in two words when we call it an organ in which currents pouring in from the sense organs make with extreme facility paths which do not easily disappear For of course a simple habit like every other nervous event—the habit of snuffling for example or of putting one s hands into one s pockets or of biting one s nails—is mechanically nothing but a reflex discharge and its anatomical substratum must be a path in the system The most complex habits as we shall presently see more fully are from the same point of view nothing but *concatenated* discharges in the nerve centres due to the presence there of systems of reflex paths so organized as to wake each other up successively—the impression produced by one muscular contraction serving as a stimulus to provoke the next until a final impression inhibits the process and closes the chain The only difficult mechanical problem is to explain the formation *de novo* of a simple reflex or path in a pre existing nervous system Here as in so many other cases it is only the *premier pas qui coute* For the entire nervous system *is* nothing but a system of paths between a sensory *terminus a quo* and a muscular glandular or other *terminus ad quem* A path once traversed by a nerve current might be expected to follow the law of most of the paths we know and to be scooped out and made more permeable than before and this ought to be repeated with each new passage of the current Whatever obstructions may have kept it at first from being a path should then little by little and more and more be swept out of the way until at last it might become a natural drainage channel This is what happens where either solids or liquids pass over a path there seems no reason why it should not happen where the thing that passes is a mere wave of rearrangement in matter that does not displace itself but merely changes chemically or turns itself round in place or vibrates across the line The most plausible views of the nerve current make it out to be the passage of some such *wave of rearrangement as this* If only a part of the matter of the path were to rearrange itself the neighbor

[1] Some paths to be sure are banked up by bodies moving through them under too great pressure and made impervious These special cases we disregard

— rt it is easy to see how their inertness might oppose a
nd
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ich

formula of

So nothing is easier than to imagine how when a current once has tr sed
cond time But what made it
estion we can only fall back
mass of matter whose parts
re as constantly tending to
equalize their states The equalization between any two points occurs through whatever path may at the moment be most pervious But as a given point of the system may belong actually or potentially to many different paths and as the play of nutrition is subject to accidental changes *blocks* may from time to time occur and make currents shoot through unwonted lines Such an unwonted line would be a new-created path which if traversed repeatedly would become the beginning of a new reflex arc All this is vague to the last degree and amounts to little more than saying that a new path may be formed by the sort of *cha ces* that in nervous material are likely to occur But vague as it is it is really the last word of our wisdom in the matter

It must be noticed that the growth of structural modification in livin matter may be more rapid than in any lifeless mass because the incessant nutritive reno ation of which the l ving matter is the seat tends often to corroborate and fix the impressed modification rather than to counteract it by renewing the or ginal constitution of the tissue that has been impressed Thus we notice

during the winter and to skate during the summer

Dr Carpenter writes

It is a matter of universal experience that every kind of t aining for spec al apt t des is both f r mo e effecti e and lea es mo e permanent impress when exerted

W cann t say th will f th gh many perh ps m t h man hab ts we l tary ch ns cu as we sh ll see in l ter ch pt ca be *prim rily* ch Whil an habitual ctio may ha been luntary th l tary u must bef re th t at least nce ha been impulsi refl x. It is this very first ccurrence f all that we sd in th t xt

even self-c tradict n.

Mental Phy logy (874) pp 339–45

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the nutritive operation so as to be ready for use when called upon, even after lon inaction.

What is so clearly true of the nervous apparatus of animal life can scarcel be otherwise than true of that which ministers to the automatic activity of the mind For as already hown, th tudy of psych logy has evolved no more certain resul than that there are uniformities of mental ction whi h are so entirely conformable to those

m t relation to a "mechanism of thou ht and

express—the f rme in terms

admi ted fact that any sequence of mental action which has been frequently repeated

urselves automatically promp ed to think

omed to think, feel, or do under like cir

d purpos or anticipation of result F r

ther is n reason to regard th an exception to the general princ p e that

tends to form it elf in accordance with the mode in

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result

impression on the cerebrum in virtue of which that same tate may be rep odu ed at any future tim in respondence t a suggestion fitted t excit it. The trength of early association is a fact so uni ersally recognized that t e expres on of it has become prov rbial and this precisel cords with the ph siological princip e tha dur

v of the brain will be

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d by nutritive sub titu-

tion so that t ma endure to t end of life like the ar of a wound.

Dr Carpenter s phrase that *our nervous system grows to the modes in wh ch it has been exercised* expresses the philosophy of habit in a nut hell We may now trace some of the practical applications of the principle to human life

The first result of it is that *habit simplifies th movements required to achieve a given result makes them more accurate a d d mi shes fat ue*

degree

too O en a co traction of the abdominal mu les occurs as well. Principall h w ever the impulse s determined to the mot on f the hand and of the smal finger This

proces is repea ed, th mo e ea ily the mo ement f ll ws on account of the increa e in permeabil y f th nerves engaged.

B t the mo e ea il the movement occurs the l er is th imulus required to set up and the sl r the impulse is the m s effect is confined to the fingers lone.

Thus an impul e which originally s read s effects t wh l body or at least over many f its movab parts is gradually determined to a ingle de e organ in

of muscles and the extraordinary flexibility of joints which are acquired by such as have been early exercised in gymnastic performances There is no part of the organism of man in which the *reconstructive activity* is so great during the whole period of life as it is in the ganglionic substance of the brain This is indicated by the enormous supply of blood which it receives *It is moreover a fact of great significance* that the nerve substance is specially distinguished by its *reparative* power For while injuries of other tissues (such as the muscular) which are distinguished by the *speciality* of their structure and endowments are repaired by substance of a lower or less specialized type those of nerve substance are repaired by a complete reproduction of the normal tissue as is evidenced in the sensibility of the newly forming skin which is closing over an open wound or in the recovery of the sensibility of a piece of transplanted skin which has for a time been rendered insensible by the complete interruption of the continuity of its nerves The most remarkable example of this reproduction however is afforded by the results of M Brown Séquard's[1] experiments upon the gradual restoration of the functional activity of the spinal cord after its complete division which takes place in a way that indicates rather a *reproduction* of the whole or the lower part of the cord and of the nerves proceeding from it than a mere *reunion* of divided surfaces This reproduction is but a special manifestation of the reconstructive change which is *always* taking place in the nervous system it being not less obvious to the eye of reason that the waste occasioned by its functional activity must be constantly repaired by the production of new tissue than it is to the eye of ense that such reparation supplies an actual *loss* of substance by disease or injury

Now in this constant and active reconstruction of the nervous system we recognize a most marked conformity to the general plan manifested in the nutrition of the or

progenitors But this type is peculiarly liable to modification during the early period of life in which the functional activity of the nervous system (and particularly of the brain) is extraordinarily great and the reconstructive process proportionally active And this modifiability expresses itself in the formation of the mechanism by which those *secondarily automatic* modes of movement come to be established which in man take the place of those that are *congenital* in most of the animals beneath him

growth and development Of these habits some are common to the race generally while others are peculiar to the individual those of the former kind (such as walking erect) being universally acquired save where physical inability prevents while for the latter a special training is needed which is usually the more effective the earlier it is begun—as is remarkably seen in the case of such feats of dexterity as require a conjoint education of the perceptive and of the motor powers And when thus developed during the period of growth so as to have become a part of the constitution of the adult the acquired mechanism is thenceforth maintained in the ordinary course of

[1] See later Masius in Van Benedens nd Van B mbekes A ch ves de B olog e vol I (Liége 1880)

as *A* occurs just as if *A* and the rest of the chain were fused into a continuous stream When we are learning to walk to ride to swim skate fence write play or sin we interrupt ourselves at every step by unnecessary movements and ficients on the contrary the results not only follow forth they the bird ary s eye

and before he knows it he has aimed and a momentary pressure from his rapier and the fencer finds that he has instantly made the ri ht parry and return A glance at the mu ical hieroglyphics and the rs have rippled through a cataract of notes And not only is it do but the wrong never wound up his his latchkey out on persons in going to

arriving at the door step of a their bedroom to d ess for dinner have been known to take off one garment after another and finally to get into bed merely because that was the habitual issue of the first few movements when performed at a later hour The writer well remembers how on revisiting Paris after ten years absence and finding himself in the street in which for one winter he had attended school he lost h mself in a brown study from which he was awakened by findin himself upon the stairs which led to the apartment in a house many streets away in which he er time and to which his steps from the school had

fam liar cupboards and the like movements and show their knowledge by the r surprise if the objects are alte ed so as to obl ge the movement to be made in a d fferent way But our ntres know hardly anything about the matter Few men can

These results may be expressed as follows
I t on grown habitual what instigates each new muscular contraction to

course In an habitual action mere sensation is a sufficient gu de and the upper regions of brain and mind are set comparatively free A diagram will make the matter clear

Let *A B C D E F G* represent an habitual chain of muscular contractions and l t *a b c d e f* tand for the respective sensations which the e contrac ns excite n us when they are successi ely performed Such sensations will usually be of the muscles skin or joints of the parts moved but they may also be effects of the movement upon the eye or the ear Through them and through them alone we are made aware whether the contraction has o has not occurred

which it effects the contraction of a few limited muscles In this change the thoughts and perceptions which start the impulse acquire more and more intimate causal relations with a particular group of motor nerves

To recur to a simile at least partially apt imagine the nervous system to represent a drainage system inclining on the whole toward certain muscles but with the escape thither somewhat clogged Then streams of water will on the whole tend most to fill the drains that go towards these muscles and to wash out the escape In case of a sudden flushing however the whole system of channels will fill itself and the water overflow everywhere before it escapes But a moderate quantity of water invading the system will flow through the proper escape alone

Just so with the piano player As soon as his impulse which has gradually learned to confine itself to single muscles grows extreme it overflows into larger muscular regions He usually plays with his fingers his body being at rest But no sooner does he get excited than his whole body becomes animated and he moves his head and trunk in particular as if these also were organs with which he meant to belabor the keys [1]

Man is born with a tendency to do more things than he has ready made arrangements for in his nerve centres Most of the performances of other animals are automatic But in him the number of them is so enormous that most of them must be the fruit of painful study If practice did not make perfect nor habit economize the expense of nervous and muscular energy he would therefore be in a sorry plight As Dr Maudsley says [2]

If an act became no easier after being done several times if the careful direction of consciousness were necessary to its accomplishment on each occasion it is evident that the whole activity of a lifetime might be confined to one or two deeds—that no progress could take place in development A man might be occupied all day in dressing and undressing himself the attitude of his body would absorb all his attention and energy the washing of his hands or the fastening of a button would be as difficult to him on each occasion as to the child on its first trial and he would furthermore be completely exhausted by his exertions Think of the pains necessary to teach a child to stand of the many efforts which it must make and of the ease with which it at last stands unconscious of any effort For while secondarily automatic acts are accomplished with comparatively little weariness—in this regard approaching the organic movements or the original reflex movements—the conscious effort of the will soon produces exhaustion A spinal cord without memory would simply be an idiotic spinal cord It is impossible for an individual to realize how much he owes to its automatic agency until disease has impaired its functions

The next result is that *habit diminishes the conscious attention with which our acts are performed*

One may state this abstractly thus If an act require for its execution a chain *A B C D E F G* etc of successive nervous events then in the first performances of the action the conscious will must choose each of these events from a number of wrong alternatives that tend to present themselves but habit soon brings it about that each event calls up its own appropriate successor without any alternative offering itself and without any reference to the conscious will until at last the whole chain *A B C D E F G* rattles itself off as soon

[1] G H Schneider *Der menschliche Wille* (1882) pp 417 19 (freely translated) For the drain simile see also Spencer's *Psychology* part v chap viii

[2] *Physiology of Mind* p 155

having fter a month's practice become th rough master of the art of keeping up ... ed a book befo e him and, while the balls were in the air ... probably eem to ... that ... years ... hed the ha e elapsed since th time I was ... balls during that period, I can still manage to read with ease while keeping t ee balls up. (*Autobiography* p 26)

We have called *a b c d e f* the antecedents of the successive muscular at tractions by the name of sensations Some authors seem to deny that they are even this. If not even this, they can only be centripetal nerve-currents not sufficient to arouse feelin but sufficient to arouse motor response[2] It ma be at once admitted that they are not distinct *vol tions* The will if any will be present limits itself to a *permission* that they exert their motor effects Dr Carpenter writes

> There may still be m taphysicians who maintain that acti ns which were originally prompted by the will with a distinct intenti n and which are still entirely under its control can never cease to be litional and that either an infinitesimally small am unt of will is required to sustain them when they ha e been once set going or that the will is in a ort of pendulum-like oscillation between the two actions—the main tenance of the train of *thought* and th maintenance of the train f *movement* But if onl an infinitesimally small amount of will is necessary to sustain them, is no this tantam unt to saying that they go on by a force of their own? And does n t the ex perience of the *perfect continu y of* ur train of th ugh durin the perf rmance f movemen s that ha e become hab tual, entirely negative the hypothesis of oscillation? Bes des f uch an oscillation exi ed, there must be *tervals* in which each action goes on *of its lf* so that its essentiall automatic character is irtually admitted. The p ological explanation that the mechanism of locomoti n, as of other habitual movements *grow* t the mode in which t is early exercised, and that it then works au maticall under the general co trol and direction of the will, can scarcely be put d wn by any assumption of an hypothetical necess ty which rests only on the basis f ... of o e ... of our composite nature.

But if not distinct *acts of will* these immediate antecedents of each movement of the chain are at any rate accompanied by consciousness of some kind. They are *sens t ons* to which we are *usually inattent e* but which immediately call our attention if they go *wrong* Schneider's account of these sensations deserves to be quoted. In the act of walkin he says even when our attention is entirely off

> w are con inuously aware of certain muscular feelings and we have, moreover a feeling of certain impulses to keep our equilibrium and to set down le after an other It is doubtful whether we could preserve equilibrium if no sensati n of our body t ude were there and doubtful w ether w s uld dvance our le f we had no sensation f its movement as executed, and t even a minimal feeling f impulse t set t down. Knitting ppears altogether mechanical and the kn tter keeps up her knitting even wh e reads or is engaged in lively talk. But if we ask her h w this be

Carpenter's *Mental Physiology* (4) pp 8

[2] Von Hartmann devotes chapter f his *Ph phy f the U scio* (English translation, vol 1 p) proving that they must be both ... and unc scious

Mental Physiology p ...

When the series *A B C D E F G* is being learned each of these sensations becomes the object of a separate perception by the mind By it we test each movement to see if it be right before advancing to the next We hesitate compare choose revoke reject etc by intellectual means and the order by which the next movement is discharged is an express order from the ideational centres after this deliberation has been gone through

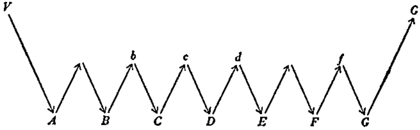


FIG 24

In habitual action on the contrary the only impulse which the centres of idea or perception need send down is the initial impulse the command to *start* This is represented in the diagram by *V* it may be a thought of the first movement or of the last result or a mere perception of some of the habitual conditions of the chain the presence e g of the keyboard near the hand In the present case no sooner has the conscious thought or volition instigated movement *A* than *A* through the sensation *a* of its own occurrence awakens *B* reflexly *B* then excites *C* through *b* and so on till the chain is ended when the intellect generally takes cognizance of the final result The process in fact resembles the passage of a wave of peristaltic motion down the bowels The intellectual perception at the end is indicated in the diagram by the effect of *G* being represented at *G* in the ideational centres above the merely sensational line The sensational impressions *a b c d e f* are all supposed to have their seat below the ideational lines That our ideational centres if involved at all by *a b c d e f* are involved in a minimal degree is shown by the fact that the attention may be wholly absorbed elsewhere We may say our prayers or repeat the alphabet with our attention far away

A musical performer will play a piece which has become familiar by repetition while carrying on an animated conversation or while continuously engrossed by some train of deeply interesting thought the accustomed sequence of movements being directly prompted by the *sight* of the notes or by the remembered succession of the *sounds*

sations
train
plished
ds and

being prompted to action by the will is furnished by Robert Houdin

With a view of cultivating the rapidity of visual and tactile perception and the precision of respondent movements which are necessary for success in every kind of prestidigitation Houdin early practised the art of juggling with balls in the air and

edification on this account alone We need make no apology then for tracing a few of these consequences ourselves

Habit a second nature! Habit is ten times nature the Duke of Wellington is said to have exclaimed and the degree to which this is true no one can probably appreciate as well as one who is a veteran soldier himself The daily drill and the years of discipline end by fashionin a man completely over again as to most of the possibilities of his conduct

The e is a story which s cr dible en ugh thou h it may not be true of a practical ... carrying home his dinner sudde ly c lled out

Riderless cavalry horses at many a battle have been seen to come t ... and go through their customary evolutions at the sound of the bugle-call ... animals dogs and oxen and *omnibus* and car horses ... do- ... s gn ... Men grown old in pri on have asked to be readm ... In a ... the United States some time in ... ve emerged but pres ... new responsibilities so

Hab t is thus the enormous fly wheel of society ... o t precious conservative agent It alone is what keeps us all within the bounds of ordinance and sa es the children of fortune from the envious uprisings of the poor It alone prevents the hardest and most repulsive walks of life from being deserted by those brought up to tread therein It keeps the fisherman and the deck hand at ea through the winter it holds the miner in his darkness and nails the country man to h s lo -cab n and his lonely farm through all the months of snow it protects us from inva ion by the nat es of the desert and the frozen zone It dooms us all to fight out the battle of life upon the lines of our nurture or our early cho ce and to make the best of a pursuit that d sagrees because there is no other for which we are fitted and it is too late to begin again It keeps different ... ou see the p o-

nd by no more escape than his coat sleeve can suddenly fall into a new set of folds On the whole it is best he should not escape It is well for the world that in most of us by the age of thirty the character has set like plaster and will never soften aga n

If the period between twenty and th rty is the critical one in the formation of ntellectual and professional habits the period below twenty is more important st ll for the fixing of *pe so al* habits p operly so called such as vocaliza

Huxley *Elementary Le ns in Phy l gy* lesso XII.

possible she will hardly reply that the knitting goes on of itself She will rather say that she has a feeling of it that she feels in her hands that she knits and how she must knit and that therefore the movements of knitting are called forth and regulated by the sensations associated therewithal even when the attention is called away

So of every one who practises apparently automatically a long familiar handicraft The smith turning his tongs as he smites the iron the carpenter wielding his plane the lace maker with her bobbin the weaver at his loom all will answer the same question in the same way by saying that they have a feeling of the proper management of the implement in their hands

In these cases the feelin
faint But none the less ar
movements could then only
away the movements ought to come to a standstill which is a consequence that seldom occurs [1]

Again

An idea makes you take for example a violin into your left hand But it is not necessary that your idea remain fixed on the contraction of the muscles of the left hand and fingers in order that the violin may continue to be held fast and not let fall The sensations themselves which the holding of the instrument awakens in the hand since they are associated with the motor impulse of grasping are sufficient to cause this impulse which then lasts as long as the feeling itself lasts or until the impulse is inhibited by the idea of some antagonistic motion

And the same may be said of the manner in which the right hand holds the bow

It sometimes happens in beginning these simultaneous combinations that one movement or impulse will cease if the consciousness turn particularly toward another because at the outset the guiding sensations must *all* be strongly *felt* The bow will perhaps slip from the fingers because some of the muscles have relaxed But the slipping is a cause of new sensations starting up in the hand so that the attention is in a moment brought back to the grasping of the bow

The following experiment shows this well When one begins to play on the violin to keep him from raising his right elbow in playing a book is placed under his right armpit which he is ordered to hold fast by keeping the upper arm tight against his body The muscular feelings and feelings of contact connected with the book provoke an impulse to press it tight But often it happens that the beginner whose attention gets absorbed in the production of the notes lets drop the book Later however this never happens the faintest sensations of contact suffice to awaken the impulse to keep it in its place and the attention may be wholly absorbed by the notes and the fingering with the left hand *The simultaneous combination of movements is thus in the first instance conditioned by the facility with which in us alongside of intellectual processes processes of inattentive feeling may still go on* [2]

This brings us by a very natural transition to the *ethical implications of the law of habit* They are numerous and momentous Dr Carpenter from whose *Mental Physiology* we have quoted has so prominently enforced the principle that our organs grow to the way in which they have been exercised and dwelt upon its consequences that his book almost deserves to be called a work of

[1] *Der me schl che W lle* pp 447–48
[2] *Ibid* p 439 The last sentence is rather freely translated—th sense is un lte ed

ers that the one may have a enes of unin errupted succes es until repetition has forti fied t to such a degree as t enable t t cope with the oppo..tion, under any circum sta..ces This is the theoreticall best career of mental progress.

The need of securing success at the *outset* is imperative Failure at first is apt to dampen the energy of all future attempts whereas pa..t experience of success nerves one to future vigor Goethe says to a man who consulted him about an enterprise but mistrusted his own powers *Ach!* you need only blow on your hands And the remark illu..trates the effect on Goethe s spirits of his own hab tually successful career Prof Baumann from whom I borrow the h collapse of barbarian nations when Europeans come

The question of taperin -off ... opium indulgence comes in here and is a question about which experts differ ... be best for an individual ca..e acquisition ... *rym it out*

We mu..t be careful not to give the will so ... e its defeat at the very out..et but *pro ded one can sta d t* a sharp period of suffering and then a free time is the best thing to aim at whether in giving up a habit like that of opium or in simply changing one s hours of ri..ing or of work It is surpri.. how soon a desire will d e of inanition if it be *never* fed

One must first learn, unmo ed, looking neither to the ri..ht no left, to walk firmly on the trait a..d narrow path, before o e c..n begin to make one s elf o e again. H wh every day makes a fresh resol e is like one wh arri ing at the ed..e of the d.t h he t l p f rev r ops a d turns fo a fresh run W thou *unb oken* d

A third maxim may be added to the preceding pair *Se e the very first pos s ble o portu ty to act on e ery resolution you make a d on every emot onal prompt you may experience in the d rect o of the hab ts you aspire to ga n* It is n t in the moment of their forming but in the moment of their producing *mo or e ects* that resolves and aspirations communicate the new et to the brain As the author last quoted remarks

Th actual presence of the practical opportunity alone furnishes the fulcrum upon which th lever can rest by means of which t.. moral will may multiply i..s trength a..d raise se..f al ft. He w o has no solid ground to pres again..t will never get beyond t..e s a..e of empt ges ure-making

No matter how full a reservoir of *maxims* one may possess and no matter how good one s *sent ments* may be if one has not taken advanta e of every concrete opportunity to *act* one s character ma remain entirel unaffected for the better With mere good intentions hell is proverbially paved And this is an obvious conseq ence of the principles we have laid down A character "

See th dmira le passage bout success t th outset in his *Handbuch der Moral* (3 3) pp 35-43.

J Ba..sen Be g *Char kter l gie* (867) l. I, p 09

tion and pronunciation gesture motion and address Hardly ever is a lan guage learned after twenty spoken without a foreign accent hardly ever can a youth transferred to the society of his betters unlearn the nasality and other vices of speech bred in him by the associations of his growing years Hardly ever indeed no matter how much money there be in his pocket can he even learn to *dress* like a gentleman born The merchants offer their wares as eagerly to him as to the veriest swell but he simply ca

y till his dying day

The great thing then in all education is to *make our nervous system our ally instead of our enemy* It is to fund and capitalize our acquisitions and live at ease upon the interest of the fund *For this we must make automatic and habitual as early as possible as many useful actions as we can* and guard against the growing into ways that are likely to be disadvantageous to us as we should guard against the plague The more of the details of our daily life we can hand over to the effortless custody of automatism the more our higher powers of mind will be set free for their own proper work There is no more miserable human being than one in whom nothing is habitual but indecision and for whom the lighting of every cigar the drinking of every cup the time of rising and going to bed every day and the beginning of every bit of work are subjects of express volitional deliberation Full half the time of such a man goes to the deciding or regretting of matters which ought to b

In Professor Bain s chapter on The Moral Habits there are some admir able practical remarks laid down Two great maxims emerge from his treat ment The first is that in the acquisition of a new habit or the leaving off of an old one we must take care to *launch ourselves with as strong and decided an initiative as possible* Accumulate all the possible circumstances which shall re enforce the right motives put yourself assiduously in conditions that en courage the new way make engagements incompatible with the old take a public pledge if the case allows in short envelop your resolution with every aid you know This will give your new beginning such a momentum that the temptation to break down will not occur as soon as it otherwise might and every day during which a breakdown is postponed adds to the chances of its not occurring at all

The second maxim is *Never suffer an exception to occur till the new habit is securely rooted in your life* Each lapse is like the letting fall of a ball of string which one is carefully winding up a single slip undoes more than a great many turns will wind again *Continuity* of training is the great means of mak ing the nervous system act infallibly right As Professor Bain says

s ent a precaution therefore is so to regulate the two opposing pow

ers, but he one may have a series of uninterrupted successes until repetition has fortified it to such a degree as to enable it to cope with the opposition, under any circumstances. This is the theoretically best career of mental progress.

The need of securing success at the *outset* is imperative. Failure at first is apt to dampen the energy of all future attempts, whereas past experience of success nerves one to future vigor. Goethe says to a man who consulted him about an enterprise but mistrusted his own powers: "Ach! you need only blow on your hands!" And the remark illustrates the effect on Goethe's spirits of his own habitually successful career. Prof. Baumann, from whom I borrow the anecdote,[1] says that the collapse of barbarian nations when Europeans come among them is due to their despair of ever succeeding as the new-comers do in the larger tasks of life. Old ways are broken and new ones not formed.

The question of "tapering-off," in abandoning such habits as drink and opium-indulgence, comes in here, and is a question about which experts differ within certain limits, and in regard to what may be best for an individual case. In the main, however, all expert opinion would agree that abrupt acquisition of the new habit is the best way, *if there be a real possibility of carrying it out*. We must be careful not to give the will so stiff a task as to insure its defeat at the very outset; but, *provided one can stand it*, a sharp period of suffering, and then a free time, is the best thing to aim at, whether in giving up a habit like that of opium, or in simply changing one's hours of rising or of work. It is surprising how soon a desire will die of inanition if it be *never* fed.

"One must first learn, unmoved, looking neither to the right nor left, to walk firmly on the strait and narrow path, before one can begin to make one's self over again. He who every day makes a fresh resolve is like one who, arriving at the edge of the ditch he is to leap, forever stops and returns for a fresh run. Without *unbroken* advance there is no such thing as *accumulation* of the ethical forces possible, and to make this possible, and to exercise us and habituate us in it, is the sovereign blessing of regular work."[2]

A third maxim may be added to the preceding pair: *Seize the very first possible opportunity to act on every resolution you make, and on every emotional prompting you may experience in the direction of the habits you aspire to gain.* It is not in the moment of their forming, but in the moment of their producing *motor effects*, that resolves and aspirations communicate the new "set" to the brain. As the author last quoted remarks:

"The actual presence of the practical opportunity alone furnishes the fulcrum upon which the lever can rest, by means of which the moral will may multiply its strength, and raise itself aloft. He who has no solid ground to press against will never get beyond the stage of empty gesture-making."

No matter how full a reservoir of *maxims* one may possess, and no matter how good one's *sentiments* may be, if one has not taken advantage of every concrete opportunity to *act*, one's character may remain entirely unaffected for the better. With mere good intentions hell is proverbially paved. And this is an obvious consequence of the principles we have laid down. A "character,"

[1] See the admirable passage about success at the outset, in his Handbuch der Moral (1878), pp. 295-6.

[2] J. Bahnsen: Beiträge zur Charakterologie (1867), vol. I. p. 209.

tion and pronunciation gesture motion and address Hardly ever is a language learned after twenty spoken without a foreign accent hardly ever can a youth transferred to the society of his betters unlearn the nasality and other vices of speech bred in him by the associations of his growing years Hardly ever indeed no matter how much money there be in his pocket can he even *learn to dress* like a gentleman born The merchants offer their wares as eagerly to him as to the veriest swell but he simply *cannot* buy the right things An invisible law as strong as gravitation keeps him within his orbit arrayed this year as he was the last and how his better bred acquaintances contrive to get the things they wear will be for him a mystery till his dying day

The great thing then in all education is to *make our nervous system our ally instead of our enemy* It is to fund and capitalize our acquisitions and live at ease upon the interest of the fund *For this we must make automatic and habitual as early as possible as many useful actions as we can* and guard against the growing into ways that are likely to be disadvantageous to us as we should guard against the plague The more of the details of our daily life we can hand over to the effortless custody of automatism the more our higher powers of mind will be set free for their own proper work There is no more miserable human being than one in whom nothing is habitual but indecision and for whom the lighting of every cigar the drinking of every cup the time of rising and going to bed every day and the beginning of every bit of work are subjects of express volitional deliberation Full half the time of such a man goes to the deciding or regretting of matters which ought to be so ingrained in him as practically not to exist for his consciousness at all If there be such daily duties not yet ingrained in any one of my readers let him begin this very hour to set the matter right

In Professor Bain s chapter on The Moral Habits there are some admirable practical remarks laid down Two great maxims emerge from his treatment The first is that in the acquisition of a new habit or the leaving off of an old one we must take care to *launch ourselves with as strong and decided an initiative as possible* Accumulate all the possible circumstances which shall re enforce the right motives put yourself assiduously in conditions that encourage the new way make engagements incompatible with the old take a public pledge if the case allows in short envelop your resolution with every aid you know This will give your new beginning such a momentum that the temptation to break down will not occur as soon as it otherwise might and every day during which a breakdown is postponed adds to the chances of its not occurring at all

The second maxim is *Never suffer an exception to occur till the new habit is securely rooted in your life* Each lapse is like the letting fall of a ball of string which one is carefully winding up a single slip undoes more than a great many turns will wind again *Continuity* of training is the great means of making the nervous system act infallibly right As Professor Bain says

The peculiarity of the moral habits contradistinguishing them from the intellectual acquisitions is the presence of two hostile powers one to be gradually raised into the ascendant over the other It is necessary above all things in such a situation never to lose a battle Every gain on the wrong side undoes the effect of many conquests on the right The essential precaution therefore is so to regulate the two opposing pow

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nigh it may find you not un
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The physiological study of mental conditions is thus the most power l ally of hortatory ethics The hell to be endured hereafter of which theology tells is no worse than the hell we make for ourselves in this world by habitually fash ionin our characters in the wrong way Could the young but realize how soon they will become mere walking bundles of habits they would give more heed to their conduct while in the plastic state We are pinnin our own fates good or evil and never to be undone Every smallest stroke or virtue or of vice leaves l ttle scar The drunken Rip Van Winkle in Jefferson s play ex
I won t count this time!
not count it but it is being
and fibres the molecules are
countin it registering and stor ing l against him when the next temptation comes Nothin we ever do is in strict scientific literalness wiped out Of course this has its good side as well as its bad one As we become per
epa rate drinks so we become saints in the
d scientific spheres by so
have any anxiety about
y be If he keep faithfully
ve the final result to itself
ome fine morning to find
h mpetent ones of his gen n whatever pursuit he may

vance The ignorance of t has probably e ge u
fai t h artedness in youths embarkin on arduous careers than all other causes put together

as J S Mill says is a completely fashioned will and a will in the sense in which he means it is an aggregate of tendencies to act in a firm and prompt and definite way upon all the principal emergencies of life A tendency to act only becomes effectively ingrained in us in proportion to the uninterrupted frequency with which the actions actually occur and the brain grows to their use Every time a resolve or a fine glow of feeling evaporates without bear ing practical fruit is worse than a chance lost it works so as positively to hinder future resolutions and emotions from taking the normal path of discharge There is no more contemptible type of human character than that of the nerveless sentimentalist and dreamer who spends his life in a weltering sea of sensibility and emotion but who never does a manly concrete deed Rousseau inflaming all the mothers of France by his eloquence to follow Nature and nurse their babies themselves while he sends his own children to the foundling hospital is the classical example of what I mean But every one of us in his measure whenever after glowing for an abstractly formulated Good he prac tically ignores some actual case among the squalid other particulars of which that same Good lurks disguised treads straight on Rousseau s path All Goods are disguised by the vulgarity of their concomitants in this work a day world but woe to him who can only recognize them when he thinks them in their pure and abstract form! The habit of excessive novel reading and theatre going will produce true monsters in this line The weeping of a Russian lady over the fictitious personages in the play while her coachman is freezing to death on his seat outside is the sort of thing that everywhere happens on a less glaring scale Even the habit of excessive indulgence in music for those who are neither performers themselves nor musically gifted enough to take it in a purely intellectual way has probably a relaxing effect upon the character One becomes filled with emotions which habitually pass without prompting to any deed and so the inertly sentimental condition is kept up The remedy would be never to suffer one s self to have an emotion at a concert without expressing it afterward in *some* active way[1] Let the expression be the least thing in the world—*speaking genially to one s aunt or giving up one s seat in* a horse car if nothing more heroic offers—but let it not fail to take place

These latter cases make us aware that it is not simply *particular lines* of discharge but also *general forms* of discharge that seem to be grooved out by habit in the brain Just as if we let our emotions evaporate they get into a

often flinch from
icity will be gone
itly it will wander
two names for the
l we do not know

The strongest reason for believing that they do depend on brain processes at all and are not pure acts of the spirit is just this fact that they seem in some

day That is be systematically ascetic or heroic in little unnecessary points do

[1] See for ema ks on th s subject re dable art cl by Mis V Scudder on Music I D v otees and Morals in the *Andover Review* for January 1887

Mechanical function it would have none The sen e-organs would awaken the brain-cells these would awaken each other in rational and orderly sequence until the time for action came and then the last brain vibration would discharge downward into the motor tracts But this would be a quite autonomous chain of occurrences and whatever mind went with it would be there only as an epiphenomenon an inert spectator a sort of foam aura or melody as Mr Hodgson says whose opposition or whose furtherance would be alike powerless o er the occurrences themselves When talkin some time ago we ou ht not accordin ly *as phys olo ists* to have said anythin about considerations as guiding the animal We ought to have said paths left in the hemispherical cortex by former currents and nothing more

Now so simple and attracti e is this conception from the consistently physio- [illegible] ew that it is quite wonderful to see how late it was stumbled [illegible] been explained to them [illegible] e writin against it is by men who ha e as yet failed to [illegible] minations Since this has been the case it seems worth while to devote a few more words to makin it plausible befo e criticism it ourselves

To Descartes belongs the credit of having first been bold enou h to conce ve of a completely elf sufficing nervous mechanism which hould be able to per form compl cated and apparently intelligent acts By a singularly arbitrary restriction however Descartes topped short at man and while contend ng that in beasts the nervous machinery was all he held that the hi her acts of [illegible] f the a ency of his rational soul The opinion that beasts [illegible] self [illegible] and with its abandonment the very [illegible] ght wo k the work of intelli ence which was an integral though detachable part of the whole theory seemed also to sl p out of men s conception until in this century the elaboration of the doctrine of reflex action made it possible and natural that it should again arise But it was not till 1870 I believe that Mr Hodgson made the decisive step by saying that feelings no matter how intensely they may be present can have no causal efficacy whatever and compa in them to the c lors laid on the surface of a mosaic, of which the events in the nervous system are represented b the stones Obviously the stones are held in pla e by each other and not by the several colors which they support

About the same time Mr Spaldin and a little later Messrs Huxley and Clifford, gave great publicity to an identical doctrine though in their case it was backed by less refined metaphysical cons derations

Th Th ory f P ct vol I, p 4 6 ff

Chapter V

THE AUTOMATON THEORY

In describing the functions of the hemispheres a short way back we used language derived from both the bodily and the mental life saying now that the animal made indeterminate and unforeseeable reactions and anon that he was swayed by considerations of future good and evil treating his hemi spheres sometimes as the seat of memory and ideas in the psychic sense and sometimes talking of them as simply a complicated addition to his reflex ma chinery This sort of vacillation in the point of view is a fatal incident of all ordinary talk about these questions but I must now settle my scores with those readers to whom I already dropped a word in passing (see page 15 note) and who have probably been dissatisfied with my conduct ever since

Suppose we restrict our view to facts of one and the same plane and let that be the bodily plane cannot all the outward phenomena of intelligence still be exhaustively described? Those mental images those considerations whereof we spoke—presumably they do not arise without neural processes arising simultaneously with them and presumably each consideration corresponds to a process *sui generis* and unlike all the rest In other words however numerous and delicately differentiated the train of ideas may be the train of brain events that runs alongside of it must in both respects be exactly its match and we must postulate a neural machinery that offers a living counterpart for every shading however fine of the history of its owner s mind Whatever degree of complication the latter may reach the complication of the machinery must be quite as extreme otherwise we should have to admit that there may be mental events to which no brain events correspond But such an admission as this the physiologist is reluctant to make It would violate all his beliefs No psychosis without neurosis is one form which the principle of continuity takes in his mind

But this principle forces the physiologist to make still another step If neural action is as complicated as mind and if in the sympathetic system and lower spinal cord we see what so far as we know is unconscious neural action execut ing deeds that to all outward intent may be called intelligent what is there to hinder us from supposing that even where we know consciousness to be there the still more complicated neural action which we believe to be its inseparable companion is alone and of itself the real agent of whatever intelligent deeds may appear? As actions of a certain degree of complexity are brought about by mere mechanism why may not actions of a still greater degree of complex ity be the result of a more refined mechanism? The conception of reflex action is surely one of the best conquests of physiological theory why not be radical with it? Why not say that just as the spinal cord is a machine with few reflexes

But what on this [illegible]

To comprehend completely the consequences of the dogma so confidently enunciated one should unflinchingly apply it to the most complicated examples The movements of our tongues and pens the flashings of our eyes in conversation are of course events of a material order and as such their causal antecedents must be exclusively material If we knew thoroughly the nervous system of Shakespeare and as thoroughly all his environing conditions we should be able to show why at a certain period of his life his hand came to trace on certain sheets of paper those crabbed little black marks which we for shortness sake call the manuscript of *Hamlet* We should understand the rationale of every erasure and alteration therein and we should understand all this without in the slightest degree acknowledging the existence of the thoughts in Shakespeare s mind The words and sentences would be taken not as signs of anything beyond themselves but as little outward facts pure and simple In like manner we might exhaustively write the *biography of those two hundred pounds* more or less of warmish albuminoid matter called Martin Luther without ever implying that it felt

But on the other hand nothing in all this could prevent us from giving an equally complete account of either Luther s or Shakespeare s spiritual history an account in which every gleam of thought and emotion should find its place The mind history would run alongside of the body history of each man and each point in the one would correspond to but not react upon, a point in the other So the melody floats from the harp-string but neither checks nor quickens its vibrations so the shadow runs alongside the pedestrian but in no way influences his steps

Another inference apparently more paradoxical still needs to be made though as far as I am aware Dr Hodgson is the only writer who has explicitly drawn it. That inference is that feelings not causing nerve-actions cannot even cause each other To ordinary common sense felt pain is as such not only the cause of outward tears and cries but also the cause of such inward ... des ... inventive thought So the conscious- ... the awareness ... the automaton ... of some nerve- ... ment The first ... attached to the second consequently found itself following upon the feeling that was attached to the first If for example good news was the consciousness correlated with the first movement then joy turned out to be the correlate in consciousness of the second But all the while the items of the nerve series were the only ones in causal continuity the items of the conscious series however inwardly rational their sequence were simply juxtaposed

Reasons for the Theory

The conscious automaton theory as this conception is generally called is thus a radical and simple conception of the manner in which certain facts may possibly occur But between conception and belief proof ought to lie And when we ask What proves that all this is more than a mere conception of the

A few sentences from Huxley and Clifford may be subjoined to make the matter entirely clear Professor Huxley says

The consciousness of brutes would appear to be related to the mechanism of their body simply as a collateral product of its working and to be as completely without any power of modifying that working as the steam whistle which accompanies the work of a locomotive engine is without influence on its machinery Their volition if they have any is an emotion *indicative* of physical changes not a *cause* of such changes The soul stands related to the body as the bell of a clock to the works and consciousness answers to the sound which the bell gives out when it is struck

Thus far I have strictly confined myself to the automatism of brutes It is *quite true that to the best of my judgment the argumentation which applies to brutes* holds equally good of men and therefore that all states of consciousness in us as in them are immediately caused by molecular changes of the brain substance It seems to me that in men as in brutes there is no proof that any state of consciousness is the cause of change in the motion of the matter of the organism If these positions are *well based it follows that our mental conditions are simply the symbols in conscious*

are conscious automata

Professor Clifford writes

All the evidence that we have goes to show that the physical world gets along entirely by itself according to practically universal rules The train of physical facts between the stimulus sent into the eye or to any one of our senses and the exertion which follows it and the train of physical facts which goes on in the brain even when there is no stimulus and no exertion —these are perfectly complete physical trains and every step is fully accounted for by mechanical conditions The two things are on utterly different platforms—the physical facts go along by themselves and the mental facts go along by themselves There is a parallelism between them but there is no interference of one with the other Again if anybody says that the will influences matter the statement is not untrue but it is nonsense Such an assertion belongs to the crude materialism of the savage The only thing which influences matter is the position of surrounding matter or the motion of surrounding matter The assertion that another man s volition a feeling in his consciousness that I cannot perceive is part of the train of physical facts which I may perceive—this is neither true nor untrue but nonsense it is a combination of words whose corresponding ideas

coexists with the motion of legs if we want to talk about mental facts [illegible] fore we ask What is the physical link between the ingoing message from chilled skin and the outgoing message which moves the leg? and the answer is A man s will we have as much right to be amused as if we had asked our friend with the picture what pigment was used in painting the cannon in the foreground and received the answer Wrought iron It will be found excellent practice in the mental operations [illegible] and [illegible] ages [illegible] the

steal bi ding two molecul s t g th r It is imposs ble Equally impossible is it to imagine a similar idea loo enin the attracti e force between two molecules [1]

This passage from an exceedin ly clever writer expresses admirably the dif ficulty to which I allude Combined with a strong sense of the chasm be tween the two worlds and with a lively faith in reflex machinery the sense of this difficulty can hardly fail to make one turn consciousness out of the door as a superfluity so far as one s explanations go One may bow her out politely allow her to remain as an epiphenomenon (invaluable word!) but one in sists that matter shall hold all the power

hi er gnized the f thomless abyss that separates mind from mat h no chance dent of of phe g eatest rrange of con es place e change

Half h s difficulties ignored I should prefer to say For this concomitance" in the midst of absolute separateness is an utterly irrational notion It is to my mind quite inconceivable that consciou ness should have *nothi g to do* with a business which it so faithfully attends And the question What has it to do? is one which psychology has no right to surmount for it is her plain duty to consider it The fact is that the whole question of interaction and influ ence between things is a metaphysical question and cannot be discussed at all by those who are unwill n to go into matters thoroughly It is truly enough

cules but clear science though she may use such words to abbreviate dis c urse *has no use for the* conceptions and is satisfied when she can express in simple laws the bare space-relations of the molecules as functions of each other and of time To the more curiously inquiring mind however this simpli fied express on of the bare facts is not enough there must be a reason for them and somethin must determine the laws And when one seriously sits down to consider what sort of a thing one *means* when one asks for a reason one is led so far afield so far away from popular science and its scholasticism as to see that even such a fact as the existence or non existence in the universe

Cha les M rcier *Th Nervou Sy t m d th M d* (883) p 9
Op cit p

possible? it is not easy to get a sufficient reply If we start from the frogs spinal cord and reason by continuity saying as that acts so intelligently *though unconscious* so the higher centres *though conscious* may have the in telligence they show quite as mechanically based we are immediately met by the exact counter argument from continuity an argument actually urged by such writers as Pfluger and Lewes which starts from the acts of the hemi spheres and says As *these* owe *their* intelligence to the consciousness which we know to be there so the intelligence of the spinal cord s acts must really be due to the invisible presence of a consciousness lower in degree All argu ments from continuity work in two ways you can either level up or level down by their means And it is clear that such arguments as these can eat each other up to all eternity

There remains a sort of philosophic faith bred like most faiths from an æsthetic demand Mental and physical events are on all hands admitted to present the strongest contrast in the entire field of being The chasm which yawns between them is less easily bridged over by the mind than any interval we know Why then not call it an absolute chasm and say not only that the two worlds are different but that they are independent? This gives us the comfort of all simple and absolute formulas and it makes each chain homo-geneous to our consideration When talking of nervous tremors and bodily actions we may feel secure against intrusion from an irrelevant mental world When on the other hand we speak of feelings we may with equal consistency use terms always of one denomination and never be annoyed by what Ari totle calls slipping into another kind The desire on the part of men educated in laboratories not to have their physical reasonings mixed up with such incom mensurable factors as feelings is certainly very strong I have heard a most intelligent biologist say It is high time for scientific men to protest against the recognition of any such thing as consciousness in a scientific investigation In a word feeling constitutes the unscientific half of existence and anyone

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independent status of being banishes it to a limbo of causal inertness from whence no intrusion or interruption on its part need ever be feared

Over and above this great postulate that matters must be kept simple there is it must be confessed still another highly abstract reason for denying causal efficacity to our feelings We can form no positive image of the *modus operandi* of a volition or other thought affecting the cerebral molecules

Let us try to imagine an idea say of food producing a movement say of carrying food to the mouth What is the method of its action? Does it assist the decomposi tion of the molecules of the gray matter or does it retard the process or does it alter the direction in which the shocks are distributed? Let us imagine the molecules of the gray matter combined in such a way that they will fall into simpler combinations on the impact of an incident force Now suppose the incident force in the shape of a

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of view it seems an organ superadded to the other organs which maintain the

and if moreover the defects of his other organs (where consciousness is most developed) are such as to make them need just the kind of help that consciousness would bring provided it *were* efficacious why then the plausible inference would be that it came just *because* of its efficacy—in other words its efficacy would be inductively proved

Now the study of the phenomena of consciousness which we shall make th oughout the rest of this book will show us that consciousness is at all times primarily *a selecti g agercy* Whether we take it in the lowest sphere of sense or in the hi hest of intellection we find it always doin one thin choosin one out of several of the materials so presented to its notice emphasizing and accentuat n that and suppressing as far as possible all the rest The item emphasi ed is always in close connection with some *inte est* felt by consciousness to be paramount at the time

But what are now the defects of the nervous system in those animals whose conscious ess eems most highly developed? Chief among them must be *in stab lity* The cerebral hemispheres are the characteristically high nerve-centres and we saw how indeterminate and unforeseeable their performances we e in comparison with those of the basal gan lia and the cord But this very vagueness const tutes their advantage They allow their possessor to adapt his conduct to the m nutest alterations in the environing circumstances any one

lies of discharge in the cerebrum to be almost on a par in po nt of permeability—what discharge a given small impression will pro-

at a certain moment tip it one way or the other The natural law of an organ const tuted

noth ng but a law of caprice I do not see

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sphere The dilemma in regard to the nerv us system seems in short to be of the following kind We may construct one which will react infallibly and certainly but it will then be capable of reacting to very few changes in the environment—it will fail to be adapted to all the rest We may on the other hand construct a nervous system potentially adapted to respond to an infinite variety of minute features in the s tuation but its fall bil ty will then be as great as its elaboration We can never be sure that its equilibrium will be upset

[1] See in particular th d f Ch pt IX.

of the idea of a beefsteak may not be wholly indifferent to other facts in the same universe, and in particular may have something to do with determining the distance at which two molecules in that universe shall lie apart If this is so then common sense though the intimate nature of causality and of the connection of things in the universe lies beyond her pitifully bounded horizon has the root and gist of the truth in her hands when she obstinately holds to it that feelings and ideas are causes However inadequate our ideas of causal efficacy may be we are less wide of the mark when we say that our ideas and feelings have it than the Automatists are when they say they haven t it As in the night all cats are gray so in the darkness of metaphysical criticism all causes are obscure But one has no right to pull the pall over the psychic half of the subject only as the Automatists do and to say that *that* causation is unintelligible whilst in the same breath one dogmatizes about *material* causation as if Hume Kant and Lotze had never been born One cannot thus blow hot and cold One must be impartially *naif* or impartially critical If the latter the reconstruction must be thorough going or metaphysical and will probably preserve the common sense view that ideas are forces in some translated form But Psychology is a mere natural science accepting certain terms uncritically as her data and stopping short of metaphysical reconstruction Like physics she must be *naive* and if she finds that in her very peculiar field of study ideas *seem* to be causes she had better continue to talk of them as such She gains absolutely nothing by a breach with common sense in this matter and she loses to say the least all naturalness of speech If feelings are causes of course their effects must be furtherances and checkings of internal cerebral motions of which in themselves we are entirely without knowledge It is probable that for years to come we shall have to infer what happens in the brain either from our feelings or from motor effects which we observe The organ will be for us a sort of vat in which feelings and motions somehow go on stewing together and in which innumerable things happen of which we catch but the statistical result Why, under these circumstances we should be asked to forswear the language of our childhood I cannot well imagine especially as it is perfectly compatible with the language of physiology The feelings can produce nothing absolutely new they can only reinforce and inhibit reflex currents which already exist and the original organization of these by physiological forces must always be the ground work of the psychological scheme

My conclusion is that to urge the automaton theory upon us as it is now urged on purely *a priori* and *quasi* metaphysical grounds, is an *unwarrantable impertinence in the present state of psychology*

Reasons Against the Theory

But there are much more positive reasons than this why we ought to continue to talk in psychology as if consciousness had causal efficacy The *particulars of the distribution of consciousness* so far as we know them *point to its being efficacious* Let us trace some of them

It is very generally admitted though the point would be hard to prove that consciou ness grows the more complex and intense the higher we rise in the animal kingdom That of a man must exceed that of an oyster From this point

no certainties. But the consciousness with its own ends present to it and knowing also well which possibilities lead thereto and which away will if endowed with causal efficacy reinforce the favorable possibilities and repress the unfavorable or indifferent ones. The nerve-currents coursing through the cells and fibres must in this case be supposed strengthened by the fact of their awaking one consciousness and dampened by awaking another How such reaction of the consciousness upon the currents may occur must remain at present unsolved it is enough for my purpose to have shown that it may not uselessly exist and that the matter is less simple than the brain-automatists hold.

All the facts of the natural history of consciousness lend color to this view Consciousness for example is only intense when nerve-processes are hesitant. In rapid automatic, habitual action it sinks to a minimum. Nothing could be more fitting than this if consciousness have the teleological function we suppose nothing more meaningless if not. Habitual actions are certain and being in no danger of going astray from their end need no extraneous help. In hesitant action there seem many alternative possibilities of final nervous discharge The feeling awakened by the nascent excitement of each alternative nerve-tract seems by its attractive or repulsive quality to determine whether the excitement shall abort or shall become complete Where indecision is great as before a dangerous leap consciousness is agonizingly intense Feeling from this point of view may be likened to a cross-section of the chain of nervous discharge ascertaining the links already laid down and groping among the fresh ends presented to it for the one which seems best to fit the case.

The phenomena of "vicarious function" which we studied in Chapter II seem to form another bit of circumstantial evidence A machine in working order acts fatally in one way Our consciousness calls this the right way Take out a valve throw a wheel out of gear or bend a pivot and it becomes a different machine acting just as fatally in another way which we call the wrong way But the machine itself knows nothing of wrong or right matter has no ideals to pursue A locomotive will carry its train through an open drawbridge as cheerfully as to any other destination.

A brain with part of it scooped out is virtually a new machine and during the first days after the operation functions in a thoroughly abnormal manner As a matter of fact, however its performances become from day to day more ... be needed to suspect anything wrong ... ons passing away But ... ain be there not only in order to take cognizance of each functional error but also to exert an efficient pressure to check it if it be a sin of commission, and to lend a strengthening hand if it be a weakness or sin of omission —nothing seems more natural than that the remaining parts assisted in this way should by virtue of the principle of habit grow back to the old teleological modes of exercise for which they were at first incapacitated. Nothing on the contrary seems at first sight more unnatural than that they should vicariously take up the duties of a part now lost without those duties as such exerting any persuasive or coercive force. At the end of Chapter XXVI I shall return to this again.

in the appropriate direction In short a high brain may do many things and may do each of them at a very slight hint But its hair trigger organization makes of it a happy go lucky hit or miss affair It is as likely to do the crazy as the sane thing at any given moment A low brain does few things and in doing them perfectly forfeits all other use The performances of a high brain are like dice thrown forever on a table Unless they be loaded what chance is there that the highest number will turn up oftener than the lowest?

All this is said of the brain as a physical machine pure and simple *Can consciousness increase its efficiency by loading its dice?* Such is the problem

Loading its dice would mean bringing a more or less constant pressure to bear in favor of *those* of its performances which make for the most permanent interests of the brain s owner it would mean a constant inhibition of the tendencies to stray aside

Well just such pressure and such inhibition are what consciousness *seems* to be exerting all the while And the interests in whose favor it seems to exert them are *its* interests and its alone interests which it *creates* and which but for it would have no status in the realm of being whatever We talk it is true when we are darwinizing as if the mere *body* that owns the brain had interests we speak about the utilities of its various organs and how they help or hinder the body s survival and we treat the survival as if it were an absolute end existing as such in the physical world a sort of actual *should be* presiding over the animal and judging his reactions quite apart from the presence of any commenting intelligence outside We forget that in the absence of some such superadded commenting intelligence (whether it be that of the animal itself or only ours or Mr Darwin s) the reactions cannot be properly talked of as useful or hurtful at all Considered merely physically all that can be said of them is that *if* they occur in a certain way survival will as a matter of fact prove to be their incidental consequence The organs themselves and all the rest of the physical world will however all the time be quite indifferent to this consequence and would quite as cheerfully the circumstances changed compass the animal s destruction In a word survival can enter into a purely physiological discussion only as an *hypothesis made by an onlooker* about the future But the moment you bring a consciousness into the midst survival ceases to be a mere hypothesis No longer is it *if* survival is to occur then so and so must brain and other organs work It has now become an imperative decree Survival *shall* occur and therefore organs *must* so work! *Real* ends appear for the first time now upon the world s stage The conception of consciousness as a purely cognitive form of being which is the pet way of regarding it in many idealistic schools modern as well as ancient is thoroughly anti psychological as the remainder of this book will show Every actually existing consciousness seems to itself at any rate to be a *fighter for ends* of which many but for its presence would not be ends at all Its powers of cognition are mainly subservient to these ends discerning which facts further them and which do not

Now let consciousness only be what it seems to itself and it will help an instable brain to compass its proper ends The movements of the brain *per se* yield the means of attaining these ends mechanically but only out of a lot of other ends if so they may be called which are not the proper ones of the animal but often quite opposed The brain is an instrument of possibilities but of

Chapter VI

THE MIND STUFF THEORY

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Evolutionary Psychology Demands a Mind Dust

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B t with the dawn of consciousness an entirely new nature seems to slip in something whereof the potency was *not* g en in the mere outward atoms of the or ginal chaos

There is yet another set of facts which seem explicable on the supposition that consciousness has causal efficacy *It is a well known fact that pleasures are generally associated with beneficial pains with detrimental experiences* All the fundamental vital processes illustrate this law Starvation suffocation privation of food drink and sleep work when exhausted burns wounds inflammation the effects of poison are as disagreeable as filling the hungry stomach enjoying rest and sleep after fatigue exercise after rest, and a sound skin and unbroken bones at all times are pleasant Mr Spencer and others have suggested that these coincidences are due not to any pre established harmony, but to the mere action of natural selection which would certainly kill off in the long run any breed of creatures to whom the fundamentally noxious experience seemed enjoyable An animal that should take pleasure in a feeling of suffocation would if that pleasure were efficacious enough to make him immerse his head in water enjoy a longevity of four or five minutes But if pleasures and pains have no efficacy one does not see (without some such *a priori* rational harmony as would be scouted by the scientific champions of the automaton theory) why the most noxious acts such as burning might not give thrills of delight and the most necessary ones such as breathing cause agony The exceptions to the law are it is true numerous but relate to experiences that are either not vital or not universal Drunkenness for instance which though noxious is to many persons delightful is a very exceptional experience But as the excellent physiologist Fick remarks if all rivers and springs ran alcohol instead of water either all men would now be born to hate it or our nerves would have been selected so as to drink it with impunity The only considerable attempt in fact that has been made to explain the *distribution* of our feelings is that of Mr Grant Allen in his suggestive little work *Physiological Æsthetics* and his reasoning is based exclusively on that causal efficacy of pleasures and pains which the double aspect partisans so strenuously deny

Thus then from every point of view the circumstantial evidence against that theory is strong *A priori* analysis of both brain action and conscious action shows us that if the latter were efficacious it would by its selective emphasis make amends for the indeterminateness of the former whilst the study *a posteriori* of the *distribution* of consciousness shows it to be exactly such as we might expect in an organ added for the sake of steering a nervous system grown too complex to regulate itself The conclusion that it is useful is after all this quite justifiable But if it is useful it must be so through its causal efficaciousness and the automaton theory must succumb to the theory of common sense I at any rate (pending metaphysical reconstructions not yet successfully achieved) shall have no hesitation in using the language of common sense throughout this book

phenomena of bodily life to the phenomena of mental life [1] And Mr Tyndall in the same Belfast Address from which we just quoted delivers his other famous passage

Abandonin ll d guise the co fess on that I f el bound to make before you is that I p olong the vis on ba kwa d across the boundary of the experimental e idence and di em n that matte wh ch we in our norance a d notwithstand ng our professed re e ence for ts Creator ha e hitherto co ered with opprobrium the p om se and potency of every f rm and qual ty of life

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The enemies of evolution have been quick to pounce upon this undeniable discontinuity in the data of the world and many of them from the failure of evolutionary explanations at this point have inferred their general incapacity all along the line Every one admits the entire incommensurability of feeling as such with material motion as such A motion became a feeling! —no phrase that our lips can frame is so devoid of apprehensible meaning Accordingly even the vaguest of evolutionary enthusiasts when deliberately comparing material with mental facts have been as forward as any one else to emphasize the chasm between the inner and the outer worlds

Can the oscillations of a molecule [ays Mr Spencer] be represented side by side

juxtaposition [1]

And again

site faces [2]

In other words incapable of perceiving in them any common character So Tyndall in that lucky paragraph which has been quoted so often that everyone knows it by heart

The passage from the physics of the brain to the corresponding facts of consciousness is unthinkable Granted that a definite thought and a definite molecular action in the brain occur simultaneously we do not possess the intellectual organ nor apparently any rudiment of the organ which would enable us to pass by a process of reasoning from one to the other [3]

Or in this other passage

We can trace the development of a nervous system and correlate with it the parallel phenomena of sensation and thought We see with undoubting certainty that they go hand in hand But we try to soar in a vacuum the moment we seek to comprehend the connection between them There is no fusion possible between the two classes of facts—no motor energy in the intellect of man to carry it without logical rupture from the one to the other

None the less easily however when the evolutionary afflatus is upon them do the very same writers leap over the breach whose flagrancy they are the foremost to announce and talk as if mind grew out of body in a continuous way Mr Spencer looking back on his review of mental evolution tells us how in tracing up the increase we found ourselves passing *without break* from the

[1] *Psychology* § 62 [2] *Ibid* § 272 [3] *F gme ts of Sc ce* 5th ed p 420
[4] *Belfa t Address Nat e Aug t 20 1874 p 318 I cannot help r m rking that the* h these auth rs lay so much st ess i me

such analogies obtain the things a na sou t g u t

into either of the qualities of feeling in question He tried to show how a dif ferent manner of the summation might give rise in one case to the heat and in another to the touch

A feelin f temperature [he sa s] ar.es when the intensities of the units of feeling are evenly gradated o that between two elements *a* and *b* no other unit can spatially interve e who e intensity s not also *between* that of *a* and *b* A feeling of contact per haps arises when this c nditi n is n t fulfilled. Both kinds of feeling however are composed of the same units.

But it is obv ously far clearer to interpret uch a gradation of intensities as a brain fact than as a mind fact If in the brain a tract were first excited in one of the ways suggested by Prof Fick and then again in the other it might very to the contrary that the psychic accompani h

direct result of one total brain pr

mains open Fick cannot be held to have proved psychic summation

Later both Spencer and Taine independently of each other took up the same line of thought Mr Spencer s reasoning is worth quoting *in extenso* He writes

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Thi t all Th inquiries of Professor Helmholtz have hown that when along with series of thes rap dly ecurrin n ses the e s g erated another series in whi h th o ses ar mo e rap d thou.h n t so l d, th effect i change in that qual ty kn wn as its *t mb e* A ari us mu cal in truments how us t es which are alik in p tch and t ength are di tingui habl by their harshness or sweetness their ringi g r the liquid haracters and all their pecific peculiarities are pro ed to n f m the combinat on of one two three o mo e upplementary eries f recur rent es with th hief ries of ecurrent noi.es So that while th unlik es f feeling known as d ff ences of p t h in t es due to differences of integrati n am ng th ecurrent n es of one ries the unl kenesses of feel known s differ en es f t *mbre* re d e to th simultaneous te ration with this eries of other eries ha ing th degrees of integrat on. And thus an enorm us number of qualitati ely

discontinuity comes in if a new nature comes in at all The *quantity* of the latter is quite immaterial The girl in [*Mr*] *Midshipman Easy* could not excuse the illegitimacy of her child by saying it was a little small one And Consciousness however little is an illegitimate birth in any philosophy that starts without it and yet professes to explain all facts by continuous evolution

If evolution is to work smoothly consciousness in some shape must have been present at the very origin of things Accordingly we find that the more clear sighted evolutionary philosophers are beginning to posit it there Each atom of the nebula they suppose must have had an aboriginal atom of consciousness linked with it and just as the material atoms have formed bodies and brains by massing themselves together so the mental atoms by an analogous process of aggregation have fused into those larger consciousnesses which we know in ourselves and suppose to exist in our fellow animals Some such doctrine of *atomistic hylozoism* as this is an indispensable part of a thorough going philosophy of evolution According to it there must be an infinite number of degrees of consciousness following the degrees of complication and aggregation of the primordial mind dust To prove the separate existence of these degrees of consciousness by indirect evidence since direct intuition of them is not to be had becomes therefore the first duty of psychological evolutionism

Some Alleged Proofs That Mind Dust Exists

Some of this duty we find already performed by a number of philosophers who though not interested at all in evolution have nevertheless on independent grounds convinced themselves of the existence of a vast amount of sub conscious mental life The criticism of this general opinion and its grounds will have to be postponed for a while At present let us merely deal with the arguments assumed to prove aggregation of bits of mind stuff into distinctly sensible feelings They are clear and admit of a clear reply

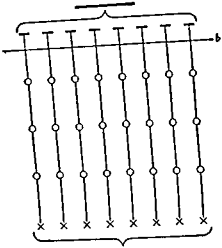
The German physiologist A Fick in 1862 was so far as I know the first to use them He made experiments on the discrimination of the feelings of warmth and of touch when only a very small portion of the skin was excited through a hole in a card the surrounding parts being protected by the card He found that under these circumstances mistakes were frequently made by the patient [1] and concluded that this must be because the number of sensations from the elementary nerve tips affected was too small to sum itself distinctly

[1] His own words are M stakes are made in the sen e that he adm ts havi g been touched when in reality it was rad nt he t that affected h s skin In ou wn before mentio ed experiments there was never any deception on the nt re palmar side of the hand or on the face On the back of the hand n one c se in a series of 60 st mul tions 4 mistak s occurr d in another case 2 mistakes in 45 stimulatio s On the extensor side of the upper arm 3 deceptions out of 48 st mulations were noticed a d in the case of nother ind idual 1 out of 31 In one case over the pine 3 deceptio i a series of 11 e c tations we e b

f ery slight ntens ty Were our various sensations ordinar ly called e must think of aving the same th m rather as success i quality as the st o g pulse of subjective change distinguished s a n rvous shock.[1]

Insufficiency of These Proofs

m y appear on a first read when we study the find the note simple mus ca l e and d screte Somewhere then there on The question is Where?—in the nerve-world or in the mind wo u lly we have no experimental proof by



On eco d f m

FIG 5

h h l can

[1] P ple f P y h l gy § 60 Oddly gh M Spen m q t w f th g ll tı f th th y f elem t ry nit f mi d st ff th l tı nary phil phy W h se t t b bs l t ly ind p nsabl f th t ph l sophy is t w k t p t l t es th b l —th simplest w y b g f rs t pp ry t m nim t d M Sp h w r ill h lt (g Fir t P pl § 7) th t ci es is ly th as l es lt of th tra f rm ti f ce t m t f physi l f t wh ch t is q l t P es m bly brain m t lready be th e bef any h t f rm ti tak pl ce d so th rgum t q ted in th t t ta ds as m l al d tail w th t g l b r ings

contrasted kinds of consciousness that seem severally elementary prove to be composed of one simple kind of consciousness combined and recombined with itself in multitudinous ways

Can we stop short here? If the different sensations known as sounds are built out of a common unit is it not to be rationally inferred that so likewise are the different sensations known as tastes and the different sensations known as odors and the different sensations known as colors? Nay shall we not regard it as probable that there is a unit common to all these strongly contrasted classes of sensations? If the unlikenesses among the sensations of each class may be due to unlikenesses among the modes of aggregation of a unit of consciousness common to them all so too may the much greater unlikenesses between the sensations of each class and those of other classes There may be a single primordial element of consciousness and the countless kind of consciousness may be produced by the compounding of this element with itself and the recompounding of its compounds with one another in higher and higher degrees so producing increased multiplicity variety and complexity

Have we any clue to this primordial element? I think we have That simple mental impression which proves to be the unit of composition of the sensation of musical tone is allied to certain other simple mental impressions differently originated The subjective effect produced by a crack or noise that has no appreciable duration is little else than a nervous shock Though we distinguish such a nervous shock as belonging to what we call sounds yet it does not differ very much from nervous shocks of other kinds An electric discharge sent through the body causes a feeling akin to that which a sudden loud report causes A strong unexpected impression made through the eyes as by a flash of lightning similarly gives rise to a start or shock and though the feeling so named seems like the electric shock to have the body at large for its seat and may therefore be regarded as the correlative rather of the efferent than of the afferent disturbance yet on remembering the mental change that results from the instantaneous transit of an object across the field of vision I think it may be perceived that the feeling accompanying the efferent disturbance is itself reduced very nearly to the same form The state of consciousness so generated is in fact comparable in quality to the initial state of consciousness caused by a blow (distinguishing it from the pain or other feeling that commences the instant after) which state of consciousness caused by a blow may be taken as the primitive and typical form of the nervous shock The fact that sudden brief disturbances thus set up by different stimuli through different sets of

change has occurred and ceased To have a sensation of redness to know a tone as acute or grave to be conscious of a taste as sweet implies in each case a considerable continuity of state If the state does not last long enough to admit of its being contemplated it cannot be classed as of this or that kind and becomes a momentary modification very similar to momentary modifications otherwise caused

It is possible then—may we not even say probable?—that something of the same order as that which we call a nervous shock is the ultimate unit of consciousness and that all the unlikenesses among our feelings result from unlike modes of integration of this ultimate unit I say of the same order because there are discernible differences among nervous shocks that are differently caused and the primitive nervous shock probably differs somewhat from each of them And I say of the same order for the further reason that while we may ascribe to them a general likeness in nature we must

n ... wh h may be taken to stand for some rather massive
... n which
top of
of men
were to start one after the other to ... t first is
good and they keep their original distance apart. Presently it is intersected by bogs each worse than the last so that the front men get so retarded that the hinder ones catch up with them before the journey is done and all arrive together at the goal.

On this supposition there ... no unperceived units of mind stuff preceding and composin the full consciousness The latter is itself an immediate psychic fact and bears an immediate relation to the neural state which is its uncondi
... hock give rise to its own psychic shock
ld be impossible to understand why
system from another hould break
up the integrity of the consciousness ... e cut has nothing to do with the psychic wo ld The atoms of mind tuff ought to float off from the nerve-matter on either side of it and come together over it and fuse just as well as if it had not been rad ... e know however that they do not that severance of the paths of
... d the rest
hears or

ke a feel
in... of greenness and a feeling of redness and make a feeli... of y... wness out of them Why has optics neglected the open road to truth, and wasted cen

ings. We cannot even (as we shall later see) have two feelings in our mind ... t once At most we can compare together *objects p ... eviously presented* to us in distinct feelings but then we find each object stubbornly maintainin its separate identity before consciousness whatever the verdict of the comparison may be

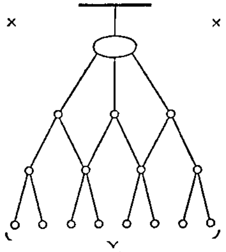
Th compounding f colors may be deal with in an identical way Helmh ltz has shown that if green light and red light fall simultaneously ... th retina, w see the col yel low The mind stuff theory would interpret this as case wh re t... feeling green and the feeling red combine int th *tertium quid* f feelin yellow What reall occurs is d bt that ... third kind f erve process is set up when t... combined lights impinge ... th

I find in my students an almost invincible tendency to think that we ca immediately perceive that feelings do ombin "What! they say "is n t t... tast f lemonade com posed f t... at f lemon plus that f sugar? This is taking th combining f bjects f th t f feelings. The physical lem nad contains both th lem and th sugar but its taste does not contain their tastes, f if there are any tw things which are certainly not present in the taste f lemo ad those are th lemo sour ... the ne hand nd the sugar sweet n th

Let the line *a—b* represent the threshold of consciousness then everything drawn below that line will symbolize a physical process everything above it will mean a fact of mind Let the crosses stand for the physical blows the circles for the events in successively higher orders of nerve cells and the horizontal marks for the facts of feeling Spencer s argument implies that each order of cells transmits just as many impulses as it receives to the cells above it so that if the blows come at the rate of 20 000 in a second the cortical cells discharge at the same rate and one unit of feeling corresponds to each one of the 20 000 discharges Then and only then does integration occur by the 0 000 units of feeling compounding with themselves into the continuous state of consciousness represented by the short line at the top of the figure

Now such an interpretation as this flies in the face of physical analogy no less than of logical intelligibility Consider physical analogy first

A pendulum may be deflected by a single blow and swing back Will it swing back the more often the more we multiply the blows? No for if they rain upon the pendulum too fast it will not swing at all but remain deflected in a sensibly stationary state In other words increasing the cause numerically need not equally increase numerically the effect Blow through a tube you get a certain musical note and increasing the blowing increases for a certain time the loudness of the note Will this be true indefinitely? No for when a certain force is reached the note instead of growing louder suddenly disappears and is replaced by its higher octave Turn on the gas slightly and light it you get a tiny flame Turn on more gas and the breadth of the flame increases Will this relation increase indefinitely? No again for at a certain moment up shoots the flame into a ragged streamer and begins to hiss Send slowly through the nerve of a frog s gastrocnemius muscle a succession of galvanic shocks you get a succession of twitches Increasing the number of shocks does not increase the twitching on the contrary it stops it and we have the muscle in the apparently stationary state of contraction called tetanus This last fact is the true analogue of what must happen between the nerve-cell and the sensory fibre It is certain that cells are more inert than fibres and that rapid vibrations in the latter can only arouse relatively simple processes or states in the former The higher cells may have even a slower rate of explosion than the lower and so the twenty thousand supposed blows of the outer air may be integrated in the cortex into a very small number of cell discharges in a second This other diagram will serve to contrast this supposition with Spencer s In Fig 26 all integration occurs below the threshold of consciousness The frequency of cell events becomes more and more reduced as we approach the cells to which feeling is most directly attached until at last we come to a condition of things symbolized



O econd f t m

FIG 26

the parallelogram of forces the forces themselves do not com eded on which they may impinge nusical sounds combine *per se* into e names for their combined effects

o be feelings the case is in no wise altered Take a hundred of m and pack them as close together as you can (whatever that may mean) still each remains the same feeling it always was shut in its own skin windowless ignorant of what the other feel are and mean There would be a hundred and first feeling there if when n a consciousness *belonging to the*

is

people and n various ways we t y

thus to be symbol c speech and never dream that the spirit opinion sentiment etc const tute a consciousness other than and additional to that of the several nd viduals whom the words a e people or public denote The pri ate minds do not agglomerate into a hi her compound mind This has always been the inv ncible contention of the spi itualists against the associa contention which we shall take up at greater length

G rney M nism m M d vi, p 53 d th articl by Pr f R yce j q eu "Mind t ff d Reality

f the m d t ff view see W K Cliff d in M d p 57 (reprinted in his Le nd Es y ii, p 7) G T Fechn P y k phy k l ii ch p xl H Tain Th bk iii E H ckel Zellse len eel nz llen in Ges mm lte Natur d 1, pp 9 5 5 iv p t ncal) M *Der philo o-* est f all these

tatem ts is, as far as it goes, that t Prince

Someone might say th t alth ugh t is tru th t neither blind man deaf man by himself ca compare so ds with l rs, yet since hears and th th sees they might d so both t th B t wh th th y re part l se togeth makes diff ren n t even f they permanently keep h use together t f they w re Siamese twins m re than Siamese twins, nd we inseparably gr wn t g ther w uld t mak the ss mpti any more possible. Only when sound and col are rep ese ted in th sam reality is it thinkable that they sh uld be compared (Bre tan P y h l gi p 09)

Self Compounding of Mental Facts is Inadmissible

But there is a still more fatal objection to the theory of mental units com pounding with themselves or integrating It is logically unintelligible it leaves out the essential feature of all the ' combinations we actually know

All the combinations which we actually know are EFFECTS *wrought by the units said to be combined* UPON SOME ENTITY OTHER THAN THEMSELVES Without this feature of a medium or vehicle the notion of combination has no sense

A multitude of contractile units by joint action and by being all connected for instance with a single tendon will pull at the same and will bring about a dynamical effect which is undoubtedly the resultant of their combined individual energies On the whole tendons are to muscular fibres and bones are to tendons combining *recipients of mechanical energies A medium of composition is indispensable to the summation of energies* To realize the complete dependence of mechanical resultants on a combining substratum one may fancy for a moment all the individually contract ing muscular elements severed from their attachments They might then still be ca pable of contracting with the same energy as before yet no co operative result would be accomplished The medium of dynamical combination would be wanting The mul tiple energies singly exerted on no common recipient would lose themselves on en tirely isolated and disconnected efforts [1]

In other words no possible number of entities (call them as you like whether forces material particles or mental elements) can sum *themselves* to- gether Each remains in the sum what it always was and the sum itself exists only *for a bystander* who happens to overlook the units and to apprehend the sum as such or else it exists in the shape of some other *effect* on an entity ex ternal to the sum itself Let it not be objected that H_2 and O combine of them selves into water and thenceforward exhibit new properties They do not The water is just the old atoms in the new position H–O–H the new prop erties are just their combined *effects* when in this position upon external media such as our sense organs and the various reagents on which water may exert its properties and be known

Aggregations are organized wholes only when they behave as such in the presence of other things A statue is an aggregation of particles of marble but as such it has no

---

[illegible] Th [illegible] present *resembles* it cannot always

[illegible] more clearly quot See his *Physics* part II [illegible]

Browne's *Metaphysics* pp 361 76 St J Mill [illegible] pp 98–101 E

Can States of Mind Be Unconscious?

The passion for unity and smoothness is in some minds so insatiate that in spite of the logical clearness of these reasonings and conclusions many will fail to be influenced by them. They establish a sort of disjointedness in things which in certain quarters will appear intolerable. They sweep away all chance of "passing without break" either from the material to the mental or from the lower to the higher mental; and they thrust us back into a pluralism of con... ...nuously in the midst of two disconnected

the region roundabout until it is a bo... f which all definite conclusions of any sort may be trusted ere long to sink and disappear.

Our reasonings have assumed that the "integration" of a thousand psychic units must be either just the units over again simply rebaptized, or else something real, but then other than and additional to those units; that if a certain existing fact is that of a thousand feelings, it cannot at the same time be that of ONE feeling; for the essence of feeling is to be felt, and as a psychic existent *feels* so it must *be*. If the one feeling feels like no one of the thousand, in what sense can it be said to *be* the thousand? These assumptions are what the monists will seek to undermine. The Hegelizers amongst them will take high ground at once, and say that the glory and beauty of the psychic life is that in it all contradictions find their reconciliation; and that it is just because the facts we are considering *are* facts of the self that they are both one and many at the same time. With this intellectual temper I confess that I cannot contend. As in striking at some unresisting gossamer with a club, one but overreaches one's self, and the thing one aims at gets no harm. So I leave this school to its devices.

The other monists are of less deliquescent frame, and try to break down distinctness among mental states by *making a distinction*. This sounds paradoxical, but it is only ingenious. The distinction is that between the *unconscious* and the *conscious being of the mental state*. It is the sovereign means for believ... science elabo- ration.

I discussing the question

feelings can have the knowledge of itself and ... still! As if anybody ever was troubled

that if th states be posited severally their collective consciousness is given and that we need no further explanation, evidence of th fact.

is equal to the square of $a+b$ a palpable untruth Idea of $a+$idea of b is *not* identical with idea of $(a+b)$ It is one, they are two in it what knows a also knows b in them what knows a is expressly posited as not knowing b etc In short the two separate ideas can never by any logic be made to figure as one and the same thing as the associated idea

This is what the spiritualists keep saying and since we do as a matter of fact have the compounded idea and do know a and b together they adopt a farther hypothesis to explain that fact The separate ideas exist, they say but *affect* a third entity the soul *This* has the compounded idea if you please so to call it and the compounded idea is an altogether new psychic fact to which the separate ideas stand in the relation not of constituents but of occasions of production

This argument of the spiritualists against the associationists has never been answered by the latter It holds good against any talk about self compounding amongst feelings against any blending or complication or mental chemistry or psychic synthesis which supposes a resultant consciousness to float off from the constituents *per se* in the absence of a supernumerary principle of consciousness which they may affect The mind stuff theory in short is unintelligible Atoms of feeling cannot compose higher feelings any more than atoms of matter can compose physical things! The things for a clear headed atomistic evolutionist are not Nothing is but the everlasting atoms When grouped in a certain way *we* name them this thing or that but the thing we name has no existence out of our mind So of the states of mind which are supposed to be compound because they know many different things together Since indubitably such states do exist they must exist as single new facts effects possibly as the spiritualists say on the soul (we will not decide that point here) but at any rate independent and integral and not compounded of psychic atoms [1]

lower states have come together or when certain brain conditio s occur together which f

ever is not the same as de ying it An alg b ic series m ght kr ow t w t t any c n trad ct on the only th ng again t it is th want of evidence f the f ct (*M d* xi p 459) Prof Ba n thinks then that all the both r is about th diff culty of eing h w se i f

— nt ns and volitions in habitual ac
ᒪ ng

emispheres u u — y
that
f the
they occ i ry or
1 — entres which we know nothing about D
t account for all of the facts[1]
y find ourselves thinking of C Now
C but we have no consciousness of
n our mind *unconsciously* and in
that state affected the sequ n deas
w have a choice between more plausible explanations
its *brain*
C without
the idea B be ng aroused at a w usly

Fou th Proof Problems unsolved when we go to bed are found solved in the morning when we wake Somnambul sts do rational things We awaken punctu ally at an hour predetermined overn ght etc Unconscious thinking volition time-reg stration etc must have presided over these acts

Reply Consciousness forgotten as in the hypnotic trance

Fifth Proof Some patients w ll often in an attack of epileptiform uncon sciousness go through complicated processes such as eating a dinner in a res taurant and paying for it or making a violent homicidal attack In trance arti fici l or pathological long and complex performances involving the use of the reasoning powe s are executed of which the patient is wholly unaware on com ing to

— mnl t bl vescence is certainly the explanation here.
oject of an hypnotic trance dur
may remember everythin per
fectly when he awakes though w ithout yo r telling him no memory would ha e rema ned The e tremely rapid oblivescence of common *dreams* is a famil ar fact

S th Proof In a mus cal concord the vibrations of the several notes are in relatively simple ratios The mind must unconsciously count the vibrations and be pleased by the s mplicity which it finds

Reply The bra n process produced by the simple ratios may be as d rectly agreeable as the conscious process of comparing them would be No countin e ther consc ous or unconscious is requ ed

more than we can say Ou conclusions run ahead of our power to analyze their grou ds A child ignorant of the axiom that two things equal to the same

[1] *Cf* Dugald St w rt *El ment* chap ii.

Do Unconscious Mental States Exist?

it will be best to give the list of so called proofs as briefly as possible and to follow each by its objection as in scholastic books[1]

First Proof The *minimum visible* the *minimum audible* are objects com posed of parts How can the whole affect the sense unless each part does? And yet each part does so without being separately sensible Leibnitz calls the total consciousness an *aperception* the supposed insensible consciousness by the name of *petites perceptions*

> To judge of the latter [he says] I am accustomed to use the example of the roar ing of the sea with which one is assailed when near the shore To hear this noise as one does one must hear the parts which compose its totality that is the noise of each wave although this noise would not be noticed if its wave were alone One must be affected a little by the movement of one wave one must have some perception of each several noise however small it be Otherwise one would not hear that of 100 000 waves for of 100 000 zeros one can never make a quantity[2]

Reply This is an excellent example of the so called fallacy of division or predicating what is true only of a collection of each member of the collection distributively It no more follows that if a thousand things together cause sen sation one thing alone must cause it than it follows that if one pound weight moves a balance then one ounce weight must move it too in less degree One ounce weight does not move it *at all* its movement *begins* with the pound At most we can say that each ounce affects it in *some* way which helps the advent of that movement And so each infra sensible stimulus to a nerve no doubt af fects the nerve and helps the birth of sensation when the other stimuli come But this affection is a nerve affection and there is not the slightest ground for supposing it to be a perception unconscious of itself A certain *quantity* of the cause may be a necessary condition to the production of *any* of the effect[3] when the latter is a mental state

Second Proof In all acquired dexterities and hal [illegible]

[illegible]

[illegible] inferences and volitions

Reply There is more than one alternative explanation in accordance with

[1] The writers ab ut unconscious cerebration seem sometimes to mean that and some t mes unconscious thought The arguments which follow re cull d from various qua te s The read r will find them most systematically urged by E on Ha tmann *Ph losophy of the Unconsc ous* vol 1 and by E Colse et *La l sci t de l spr t* (880) Con ult also T Laycock *M d nd B n* vol 1 chap v (1860) W B Carpenter *Ment l Phys iology* chap xiii F P Cobbe *D u m in M ls d Oth Essays* essay xi Uncon scious Cerebrat on (187) F Bowen *Mode Philos phy* pp 4 8–80 R H Hutt n in *Contempo a y R view* vol xxiv p 201 J S Mill *Exami tion of Ham lton* ch p xv G H Lewes *P oblems of Life a d M nd* 3d eries Prob 11 chap x nd al o P ob iii chap ii D G Thomps n *A Syst m of Psychology* chap xxxiii J M Baldwin *Hand book of Psychology* chap iv [2] *Nouveaux Essa s Av nt p opos*

[3] J S Mill *Ex m at on of H m lto* chap xv

plicable as actions of the nervous system mechanically discharged by tumuli to the senses.

Ninth Proof In sense-perception we have results in abundance which can only be explained as conclusions drawn by a process of unconscious inference from data given to sense A small human image on the retina is referred not to a pygmy but to a distant man of normal size A certain gray patch is inferred to be a white object seen in a dim light Often the inference leads us astray e.g pale gray against pale green looks red because we take a wrong premise to argue from We think a green film is spread over everything and knowing that under such a film a red thing would look gray we wrongly infer from the gray appearance that a red thing must be there Our study of space-perception in Chapter XVIII will give abundant additional examples both of the truthful and illusory percepts which have been explained to result from unconscious logic operations.

Reply That chapter will also in many cases refute this explanation Color and light-contrast are certainly purely sensational affairs in which inference plays no part. This has been satisfactorily proved by Hering and shall be treated of again in Chapter XVII Our rapid judgment of size shape distance and the like are best explained as processes of simple cerebral association Certain sense-impressions directly stimulate brain tracts of whose activity ready made conscious percepts are the immediate psychic counterparts They do this by a mechanism either connate or acquired by habit It is to be remarked that Wundt and Helmholtz who in their earlier writings did more than any o e to gi e o ue to the notion that unconscious inference is a vital factor in sense-perception ha e seen fit on later occasions to modify their views and to admit that results *like* those of reasoning may accrue without any actual rea sonin process unconsciously taking place Maybe the excessive and riotous

h H rtm nn of their principle have led them to this change

the story felt towards

to get on I must get

off

Hartmann fairly boxes the compass of the universe with the principle of

that does not exemplify

ious alternatives

look at his argu-

whom the mythology

of an object in space

g the following opera

retinal image and turns

it right de up constructin *flat space* as a preliminary operation then it computes from the angle of convergence of the eyeballs that the two retinal

Zur Lehr vom Lichtsinne (8 8)

Cf Wundt *Über den Ei f der Philo phie* et —4 in tir d (8 6) pp 10-

Helmholtz *Die Thatsa hen in der W hrn hmung* (8 9) p 7

are equal to each other applies it nevertheless in his concrete judgments un erringly A boor will use the *dictum de omni et nullo* who is unable to under stand it in abstract terms

We seldom consciously think how our house is painted what the shade of it is what the pattern of our furniture is or whether the door opens to the right or left or out or in But how quickly should we notice a change in any of these things! Think of the door you have most often opened and tell if you can whether it opens to the right or left out or in Yet when you open the door you never put the hand on the wrong side *to find the latch nor try to push it when it opens with a pull* *What is the precise* characteristic in your friend s step that enables you to recognize it when he is coming? Did you ever consciously think the idea if I run into a solid piece of matter I shall get hurt or be hindered in my progress ? and do you avoid runnin into obstacles be cause you ever distinctly conceived or consciously acquired and thought that idea?[1]

Most of our knowledge is at all times potential We act in accordance with the whole drift of what we have learned, but few items rise into consciousness at the time Many of them however we may recall at will All this co operation of unrealized principles and facts of potential knowledge with our actual thought is quite inexplicable unless we suppose the perpetual existence of an immense mass of *ideas in an unconscious state* all of them exerting a steady pressure and influence upon our conscious thinking and many of them in such continuity with it as ever and anon to become conscious themselves

Reply No such mass of ideas is supposable But there are all kinds of short cuts in the brain and processes not aroused strongly enough to give any idea distinct enough to be a premise may nevertheless help to determine just that resultant process of whose psychic accompaniment the said idea *would* be a premise if the idea existed at all A certain overtone may be a feature of my friend s voice and may conspire with the other tones thereof to arouse in my brain the process which suggests to my consciousness his name And yet I may be ignorant of the overtone *per se* and unable even when he speaks to tell whether it be there or no It leads me to the idea of the name but it produces in me no such cerebral process as that to which the *idea of the overtone* would correspond And similarly of our learning Each subject we learn leaves behind it a modification of the brain which makes it impossible for the latter to re-act upon things just as it did before and the result of the difference may be a tendency to act though with no idea much as we should *if* we were con sciously thinking about the subject The becoming conscious of the latter at will is *equally readily explained as a result of the brain modification* This as

idea it is only a particular collocation of the molecules in certain tracts of the brain

Eighth Proof Instincts as pursuits of ends by *appropriate means* are mani festations of intelligence but as the ends are not foreseen the intelligence must be unconscious

Reply Chapter XXIV will show that all the phenomena of instinct are ex

[1] J E Maude The Unconscious in Education in *Ed cat o* vol 1 p 401 (1882)

The feelings of openin and closing the glottis of making tense the tympanic membrane of accommodating for near vision of intercepting the passage from 1 h hroat are instances of what I mean Every one gets these
conscious of ex
hese facts

an unconscious way that it is ...
exists in these two ways and that therefore any arguments against the mind stuff theory based on the notion that *esse* in our mental life is *sentiri* and that an idea must consciously *be felt as what it is* fall to the ground

Objection These reasonings are one tissue of confusion. Two states of mind which refer to the same external reality or two states of mind the later one of which refers to the earlier are described as the same state of mind or idea published as it were in two editions and then whatever qualities of the second edition are found openly lacking in the first are explained as having really been there only in an unconscious way It would be difficult to believe that intelligent men could be guilty of so patent a fallacy were not the history of psychology there to give the proof The psychological stock in trade of some authors is the belief that two thoughts about one thing are virtually the same thought and that this same thought may in subsequent reflections become more and more *conscious* of what it really *was* all along from the first. But once make the distinction between simply *having an idea* at the moment of its presence and subsequently knowing all sorts of things *about it* make moreover that between a state of mind itself taken as a subjective fact, on the one hand, and the objective thing it knows on the other and one has no difficulty in escaping from the labyrinth

Take the latter distinction first Immediately all the arguments based on sensations and the new features in them which attention brings to light fall to the ground The sensations of the B and the V when we attend to these sounds and analyze out the laryngeal contribution which makes them differ from P and F respectively are *different sensations* from those of the B and V taken

h ... med st ... s he second in an unconscious form t

some sensation which it unconsciously feels[1] Comment on this seems hardly called for It is as I said pure mythology

None of these facts then appealed to so confidently in proof of the existence of ideas in an unconscious state prove anything of the sort They prove either that conscious ideas were present which the next instant were forgotten or they prove that certain results *similar* to results of reasoning may be wrought out by rapid brain processes to which no ideation seems attached But there is one more argument to be alleged less obviously insufficient than those which we have reviewed and demanding a new sort of reply

Tenth Proof There is a great class of experiences in our mental life which may be described as discoveries that a subjective condition which we have been having is really something different from what we had supposed We suddenly find ourselves bored by a thing which we thought we were enjoying well enough or in love with a person whom we imagined we only liked Or else we deliberately analyze our motives and find that at bottom they contain jealousies and cupidities which we little suspected to be there Our feelings towards people are perfect wells of motivation unconscious of itself which introspection brings to light And our sensations likewise we constantly discover new elements in sensations which we have been in the habit of receiving all our days elements too which have been there from the first since otherwise we should have been unable to distinguish the sensations containing them from others nearly allied The elements must exist for we use them to discriminate by but they must exist in an unconscious state since we so completely fail to single them out[2] The books of the analytic school of psychology abound in examples of the kind Who knows the countless associations that mingle with his each and every thought? Who can pick apart all the nameless feelings that stream in at every moment from his various internal organs muscles heart glands lungs etc and compose in their totality his sense of bodily life? Who is aware of the part played by feelings of innervation and suggestions of possible muscular exertion in all his judgments of distance shape and size? Consider too the difference between a sensation which we simply *have* and one which we *attend to* Attention gives results that seem like fresh creations and yet the feelings and elements of feeling which it reveals must have been already there—in an unconscious state We all know *practically* the difference between the so called sonant and the so called surd consonants between D B Z G V and T P S K F respectively But comparatively few persons know the difference theoretically until their attention has been called to what it is when they perceive it readily enough The sonants are nothing but the surds plus a certain element which is alike in all superadded That element is the laryngeal sound with which they are uttered surds having no such accompaniment When we hear the sonant letter both its component elements must really be in our mind but we remain unconscious of what they really are and mistake the letter for a simple quality of sound until an effort of attention teaches us its two components There exist a host of sensations which most men pass through life and never attend to and consequently have only in an unconscious way

[1] *Cf Satz vom Grunde* pp 59–65 Compare also F Zöllner's *Natur der Kometen* pp 342 ff and 425

[2] *Cf* the statements from Helmholtz to be found later in Chapter XIII.

lieve that throughout the rest of this volume the reader will reap the advantages of the simpler way of formulatin, the facts which is here begun [1]

So we seem not only to have ascertained the unintelligibility of the notion that a mental fact can be two thin*s at once and that what seems like one feelin of blueness for example or of hatred may really and unconsciously be ten thousand elementary feelin*s which do not resemble blueness or hatred at all but we find that we can express all the observed facts in other ways The mind stuff theory however thou h scotched is we may be sure not killed If we ascribe consciousness to unicellular animalcules then single cells can have it and analogy should make us ascribe it to the several cells of the brain each

n ence would it not be for the psycholo-

will! He feels an imperious crav 1 g

successive mental states which he describes The mind stuff theory so easily admits of the construction being made that it seems certain that man s unconquerable mind will devote much future pertinacity and ingenuity to set tin it on its legs again and gettin it into some sort of plausible workin, order I will therefore conclude the chapter with some consideration of the remaining difficulties which beset the matter as it at present stands

[1] Th text was written bef re P fesso Lipp G *dt t ack d S elenlebens* (183) cam int my h ds In Ch pt m f that b k th u f u consci u th ght is s b ject d t th l are t d m t searching criticism which t has j t rec d S m passages re so similar t what I ha myself writte that I must q ot th m in not Aft p ing th t dim and clearness incompl teness and compl teness do t pertain t t t f ery tat f mind must b e *actly* wh t t is and othin else—b t

cognized by an endless number of psychic states which may differ *toto cœlo* among themselves without ceasing on that account to refer to the reality in question Each of them is a conscious fact none of them has any mode of being whatever except a certain way of being felt at the moment of being present It is simply unintelligible and fantastical to say because they point to the same outer reality that they must therefore be so many editions of the same idea now in a conscious and now in an unconscious phase There is only one phase in which an idea can be, and that is a fully conscious condition If it is not in that condition then it is not at all Something else is in its place The something else may be a merely physical brain process or it may be another conscious idea Either of these things may perform much the same *function* as the first idea refer to the same object and roughly stand in the same relations to the upshot of our thought But that is no reason why we should throw away the logical principle of identity in psychology, and say that however, it may fare in the outer world the mind at any rate is a place in which a thing can be all kinds of other things without ceasing to be itself as well

Now take the other cases alleged and the other distinction that namely between *having* a mental state and knowing all *about* it The truth is here even simpler to unravel When I decide that I have without knowing it been for several weeks in love I am simply giving a name to a state which previously *I have not named* but which was fully conscious which had no residual mode of being except the manner in which it was conscious and which though it was a feeling towards the same person for whom I now have a much more inflamed feeling and though it continuously led into the latter and is similar enough to be called by the same name is yet in no sense identical with the latter and least of all in an unconscious way Again the feelings from our viscera and other dimly felt organs the feelings of innervation (if such there be) and those of muscular exertion which in our spatial judgments are supposed unconsciously to determine what we shall perceive are just exactly what we feel them perfectly determinate conscious states not vague editions of other conscious states They may be faint and weak they may be very vague cognizers of the same realities which other conscious states cognize and name exactly they may be unconscious of much in the reality which the other states are conscious of But that does not make them *in themselves* a whit dim or vague or unconscious *They are eternally as they feel when they exist and can* neither actually nor potentially be identified with anything else than their own faint selves A faint feeling may be looked back upon and classified and understood in its relations to what went before or after it in the stream of thought But it on the one hand and the later state of mind which knows all these things about it on the other are surely not two conditions one conscious and the other unconscious of the same identical psychic fact It is the destiny of thought that on the whole our early ideas are superseded by later ones giving fuller accounts of the same realities But none the less do the earlier and the later ideas preserve their own several substantive identities as so many several successive states of mind To believe the contrary would make any definite science of psychology impossible The only identity to be found among our successive ideas is their similarity of cognitive or representative function as dealing with the same objects Identity of *being* there is none and I be-

the *object* of the thought The total brain-process is composed of parts of simultaneous processes in the seeing the hearing the feelin and other centres. The ob ect thought of is also composed of parts some of which are seen others heard others perceived by touch and muscular manipulation. How then these critics will say hould the thought not itself be composed of parts each the counterpart of a part of the object and of a part of the brain-process So natural is this wa of lookin at the matter that it has given rise to what is on the whole the most flourishin of all ps chological systems—that of the Lockian school of associated ideas—of which school the mind stuff theory is nothing but the last and subtlest off hoot

The second difficulty is deeper still. *The entire brain process is not a phys*

... to an onlooking mind of a multitude of

the princip es of the corpuscular or ...

are the separate molecules or at most the cell. Their aggregation into a brain is a fiction of popular speech Such a fiction cannot serve as the objectively real counterpart to any psychic state whatever Onl a genuinely physical fact can so serve But the molecular fact is the onl genuine physical fact—whereupon we seem if we are to have an elementary psycho-physic law at all thrust right back upon somethin like the mind stuff theory for the molecular fact being an element of the brain, would seem naturally to correspond not to the total thoughts but to elements in the tho ght.

What shall we do Many would find relief at this point in celebrating the mystery of the Unknowable and the awe" which we should feel at having such a principle to take final charge of our perplexities. Others would rejoice that the finite and separatist view of things with which we started had at last developed its contradiction and was about to lead us dialectically upwards to some higher synthesis in which inconsistencies cease from troubling and logic is at rest It may be a constitutional infirmity but I can take no comfort in such devices for making a luxury of intellectual defeat They are but spiritual chloroform. Better live on the ragged edge better gnaw the file forever!

The Material Monad Theory

The most rational thing to do is to suspect that there may be a third possibility an alternative suppos tion which we have not considered Now there is an alternative supposition—a supposition moreover which has been frequently made in the history of philosophy and which is freer from logical objections than either of the views we have oursel es discussed. It may be called the

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other There is however among the cells one central or pontifical one to which our consciousness is attached But the events of all the other cells physically influence this arch-cell and throu h producing their joint effects on it these other cells may be said to combine The arch-cell is, in fact, one of those external media without which we saw that no fusion or integration of a num-

Difficulty of Stating the Connection Between Mind and Brain

It will be remembered that in our criticism of the theory of the integration of successive conscious units into a feeling of musical pitch we decided that whatever integration there was was that of the air pulses into a simpler and simpler sort of physical effect as the propagations of material change got higher and higher in the nervous system At last we said (p 15) there results some simple and massive process in the auditory centres of the hemispherical cortex to which *as a whole* the feeling of musical pitch directly corresponds Already, in discussing the localization of functions in the brain I had said (pp 104–05) that consciousness accompanies the stream of innervation through that organ and varies in quality with the character of the currents being mainly of things seen if the occipital lobes are much involved of things heard if the action is focalized in the temporal lobes etc etc and I had added that a vague formula like this was as much as one could safely venture on in the actual state of physiology The facts of mental deafness and blindness of auditory and optical aphasia show us that the whole brain must act together if certain thoughts are to occur The consciousness which is itself an integral thing not made of parts corresponds to the entire activity of the brain whatever that may be at the moment This is a way of expressing the relation of mind and brain from which I shall not depart during the remainder of the book because it expresses the bare phenomenal fact with no hypothesis and is exposed to no such logical objections as we have found to cling to the theory of ideas in combination

Nevertheless this formula which is so unobjectionable if taken vaguely, positivistically or scientifically as a mere empirical law of concomitance between our thoughts and our brain tumbles to pieces entirely if we assume to represent anything more intimate or ultimate by it The ultimate of ultimate problems of course in the study of the relations of thought and brain is to understand why and how such disparate things are connected at all But before that problem is solved (if it ever is solved) there is a less ultimate problem which must first be settled Before the connection of thought and brain can be explained it must at least be *stated* in an elementary form and there are great difficulties about so stating it To state it in elementary form one must reduce it to its lowest terms and know which mental fact and which cerebral fact are so to speak in immediate juxtaposition We must find the minimal mental fact whose being reposes directly on a brain fact and we must similarly find the minimal brain event which will have a mental counterpart at all Between the mental and the physical minima thus found there will be an immediate relation the expression of which if we had it would be the elementary psycho-physic law

Our own formula escapes the unintelligibility of psychic atoms by *taking the entire thought* (even of a complex object) *as the minimum with which it* [illegible]

those namely between the composition of the total brain process and that of

tic position The fact is that one cannot afford to despise any of these great traditional objects of belief Whether we realize it or not there is always a great drift of reasons positive and negative towing us in their direction If there be such entities as souls in the universe they may possibly be affected by the manifold occurrences that go on in the nervous centres To the state of the entire brain at a given moment they may respond by inward modifications of their own These changes of state may be *pulses of consciousness* cognitive of objects few or many simple or complex The soul would be thus a medium upon which (to use our earl er phraseology) the manifold brain processes *combine their effects* Not needing to cons der it as the inner aspect of any arch molecule or braincell we escape that physiological improbability and as its pulses of consciousness are unitary and integral affairs from the outset we escape the absurdity of supposing feelings which exist separately and then fuse together by themselves The separateness is in the brain world on this *theory* and *the unity in the soul world* and the only trouble that remains to haunt us is the metaphysical one of understanding how one sort of world or existent thing can affect or influence another at all This trouble however since it also exists ins de of both wo lds and involves neither physical improbability nor logical contrad ction is relatively small

I confess therefore that to posit a soul influenced in some mysterious way by the brain states and respondin to them by conscious affections of its own seems to me the l ne of least logical resistance so far as we yet have attained

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esses be not the simplest psycho phys c formula and the last word of a psychology wh ch co tents tself w th ve ifiable laws and seeks only to be clear and to avo d unsafe hypotheses Such a mere admiss on of the empir cal parallelism w ll there appear the wisest course By keeping to it our psychology will remain pos tivistic and non metaphysical and althou h this is certainly only a provis on l halting place and th ngs must some day be more thoroughly thought out we shall ab de there in this book and just as we have rejected

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say that nature in her unfathomable des gns has m eu us ui clay a ame of bra and mind that the two things hang indubitably together and determine each other s being but how or why no mortal may ever know

ber of things can occur The physical modifications of the arch cell thus form a sequence of results in the production whereof every other cell has a share so that as one might say every other cell is represented therein And similarly the conscious correlates to these physical modifications form a sequence of thoughts or feelings each one of which is as to its substantive being an integral and uncompounded psychic thing but each one of which may (in the exercise of its *cognitive* function) be *aware of things* many and complicated in proportion to the number of other cells that have helped to modify the central cell

By a conception of this sort one incurs neither of the internal contradictions which we found to beset the other two theories One has no unintelligible self combining of psychic units to account for on the one hand and on the other hand one need not treat as the physical counterpart of the stream of consciousness under observation a total brain activity which is non existent as a genuinely physical fact But to offset these advantages one has physiological difficulties and improbabilities There is no cell or group of cells in the brain of such anatomical or functional pre eminence as to appear to be the keystone or centre of gravity of the whole system And even if there were such a cell the theory of multiple monadism would in strictness of thought have no right to stop at it and treat it as a unit The cell is no more a unit materially considered than the total brain is a unit It is a compound of molecules just as the brain is a compound of cells and fibres And the molecules according to the prevalent physical theories are in turn compounds of atoms The theory in question therefore if radically carried out must set up for its elementary and irreducible psycho-physic couple not the cell and its consciousness but the primordial and eternal atom and its consciousness We are back at Leibnitzian monadism and therewith leave physiology behind us and dive into regions inaccessible to experience and verification and our doctrine although not self contradictory becomes so remote and unreal as to be almost as bad as if it were Speculative minds alone will take an interest in it and metaphysics not psychology will be responsible for its career That the career may be a successful one must be admitted as a possibility—a theory which Leibnitz Herbart and Lotze have taken under their protection must have some sort of a destiny

The Soul Theory

But is this my last word? By no means Many readers have certainly been saying to themselves for the last few pages Why on earth doesn t the poor man say *the Soul* and have done with it? Other readers of anti spiritualistic training and prepossessions advanced thinkers or popular evolutionists will perhaps be a little surprised to find this much despised word now sprung upon them at the end of so physiological a train of thought But the plain fact is that all the arguments for a pontifical cell or an arch monad are also arguments for that well known spiritual agent in which scholastic psychology and common sense have always believed And my only reason for beating the

A diagram will exhibit more emphatically what the assumptions of Psychology must be

1	2	3	4
Th Psych logist	Th Th ught Studied	Th Th ught s Object	Th Psych logist R lity

These four squares contain the irreducible data of psychology No 1 the psychologist believes Nos 2 3 and 4 which to ether form *his* total object to be realities and reports them and their mutual relations as truly as he can without troublin himself with the puzzle of how he can report them at all About such *ult mate* puzzles he in the main need trouble himself no more than the geometer the chemist or the botanist do who make precisely the same assumptions as he

Of certain fallacies to which the psychologist is exposed by reason of his peculiar point of view—that of being a reporter of subjective as well as of objective facts we must presently speak But not until we have considered the methods he uses for ascertaining what the facts in question are

The Methods of Investigation

I trospective Observat on is what we ha e to rely on fi st and foremost and always The word introspect on need hardly be defined—it means of course the lookin into our own minds and reporting what we there discover *Every o e ag ees that we the e discover states of consciousness* So far as I know the existence of such states has never been doubted by any critic however sceptical in other respects he may have been That we have *cogitations* of some sort is the *inconcussum* in a world most of whose other facts have at some time totte ed in the breath of ph losophic doubt All people unhesitatin ly believe that they feel themselves thinkin and that they distinguish the mental tate

cogni *lates of* as too

metaphys cal for the scope of this book

A Quest on of Nomencl tu e We ought to have some general term by which to designate all states of consciousness merely as such and apart from their p t ula quality or cogniti e function Unfortunately most of the terms in

neuter and such deri atives as feelin ly felt feltness etc which make

in the hearts of platonizing thinkers a very opprobrious set of impl cations and

On th relatio between Psych l gy and Ge eral Philosophy see G C R bertson in *Mind* vol viii, p J W rd, *ibid* p. 53 J Dewey *ibid* vol ix p

Chapter VII

THE METHODS AND SNARES OF PSYCHOLOGY

We have now finished the physiological preliminaries of our subject and must in the remaining chapters study the mental states themselves whose cerebral conditions and concomitants we have been considering hitherto Beyond the brain however there is an outer world to which the brain states themselves correspond And it will be well ere we advance farther to say a word about the relation of the mind to this larger sphere of physical fact

Psychology Is a Natural Science

That is the mind which the psychologist studies is the mind of distinct individuals inhabiting definite portions of a real space and of a real time With any other sort of mind absolute intelligence mind unattached to a particular body or mind not subject to the course of time the psychologist as such has nothing to do Mind in his mouth is only a class name for *minds* Fortunate will it be if his more modest inquiry result in any generalizations which the philosopher devoted to absolute Intelligence as such can use

To the psychologist then the minds he studies are *objects* in a world of other objects Even when he introspectively analyzes his own mind and tells what he finds there he talks about it in an objective way He says for instance that under certain circumstances the color gray appears to him green and calls the appearance an illusion This implies that he compares two objects a real color seen under certain conditions and a mental perception which he believes to represent it and that he declares the relation between them to be of a certain kind In making this critical judgment the psychologist stands as much outside of the perception which he criticises as he does of the color Both are his objects And if this is true of him when he reflects on his own conscious states how much truer is it when he treats of those of others! In German philosophy since Kant the word *Erkenntnisstheorie* criticism of the faculty of knowledge plays a great part Now the psychologist necessarily becomes such an *Erkenntnisstheoretiker* But the knowledge he theorizes about is not the bare function of knowledge which Kant criticises—he does not inquire into the possibility of knowledge *uberhaupt* He assumes it to be possible he does not doubt its presence in himself at the moment he speaks The knowledge he criticises is the knowledge of particular men about the particular things that surround them This he may upon occasion in the light of his *own* unquestioned knowledge pronounce true or false and trace the reasons by which it has become one or the other

It is highly important that this natural science point of view should be understood at the outset Otherwise more may be demanded of the psychologist than he ought to be expected to perform

And Brentano

> The phenomena inwardly apprehended are true in themselves. As they appear—of this the evidence with which they are apprehended is a warrant—so they are in reality Who then, can deny that in this a great superiority of Psychology over the physical sciences comes to light?

And again

> No one can doubt whether the psychic condition he apprehends in himself be and be so as he apprehends it. Whoever should doubt this would have reached that finished doubt which destroys itself in destroying every fixed point from which to make an attack upon knowledge.

Others have gone to the opposite extreme and maintained that we can have no introspective cognition of our own minds at all A deliverance of Auguste Comte to this effect has been so often quoted as to be almost classical and some reference to it seems therefore indispensable here.

Philosophers says Comte have

> in these latter days imagined themselves able to distinguish, by a very singular subtlety two sorts of observation of equal importance one external the other internal the latter being solely destined fo the study of intellectual phenomena. I limit myself to pointing out the principal consideration which proves clearly that this pretended direct contemplation of the mind by itself is a pure illusion. It is in fact evident that by an invincible necessity the human mind can observe directly all phenomena except its own proper states For by whom shall the observation of these be made It is conceivable that a man might observe himself with respect to the *passions* that animate him for the anatomical organs of passion are distinct from those whose function is observation. Though we have all made such observations on ourselves they can never have much scientific value and the best mode of knowing the passions will ... [illegible] them from without for every strong state of passion ... [illegible]
>
> whilst the other observes him reason ... [illegible] being in this case identical, how could observation take place This pretended psychological method is then radically null and void. On the one hand they advise you to isolate yourself as far as possible, from every external sensation, especially every intellectual work —for if you were to busy yourself even with the simplest calculation, what would become of *internal* observation —on the other hand, after having with the utmost care attained this state of intellectual slumber you must begin to contemplate the operations going on in your mind, when nothing there takes place! Our descendants will doubtless see such pretensions some day ridiculed upon the stage. The results of so strange a procedure harmonize entirely with its principle. For all the two thousand years during which metaphysicians have thus cultivated psychology they are not agreed about one intelligible and established proposition. *Internal* observation gives almost as many divergent results as there are individuals who think they practise it.

Comte hardly could have known anything of the English and nothing of the German empirical psychology The results which he had in mind when writ

Psychologie bk. ii, chap. iii, §1   *Cours de philosophie positive* I, pp 34 38

since one of the great obstacles to mutual understanding in philosophy is the use of words eulogistically and disparagingly impartial terms ought always if possible to be preferred The word *psychosis* has been proposed by Mr H ley It has the advantage of being co

are clumsy lik and they implicitly assert theories which it is not well to embody in terminology before they have been openly discussed and approved Idea is a good vague neutral word and was by Locke employed in the broadest generic way but notwithstanding his author ity it has not domesticated itself in the language so as to cover bodily sensa tions and it moreover has no verb Thought would be by far the best word to use if it could be made to cover sensations It has no opprobrious connota tion such as feeling has and it immediately suggests the omnipresence of cognition (or reference to an object other than the mental state itself) which we shall soon see to be of the mental life s essence But can the expression ' thought of a toothache ever suggest to the reader the actual present pain itself? It is hardly possible and we thus seem about to
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In this quandary we can make no definitive choice but must accord to the convenience of the context

by their unusual sound but if the connection makes it clear that mental states at large irrespective of their kind are meant this will do no harm and may even do some good[1]

The inaccuracy of introspective observation has been made a subject of debate It is important to gain some fixed ideas on this point before we proceed

The commonest spiritualistic opinion is that the soul or *subject* of the mental life is a metaphysical entity inaccessible to direct knowledge and that the vari ous mental states and operations of which we reflectively become aware are ob jects of an inner sense which does not lay hold of the real agent in itself any more than sight or hearing gives us direct knowledge of matter in itself From this point of view introspection is of course incompetent to lay hold of any thing more than the soul s *phenomena* But even then the question remains How well can it know the phenomena themselves?

Some authors take high ground here and claim for it a sort of infallibility Thus Ueberweg

[1] Compare some remarks in Mill's *Logic* bk i chap iii §§ 2 3

[2] *Logik* § 40.

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Psychologie bk. ii, chap iii §§ *Cours d ph phie positive* i, pp 34 38

since one of the great obstacles to mutual understanding in philosophy is the use of words eulogistically and disparagingly impartial terms ought always if possible to be preferred The word *psychosis* has been proposed by Mr Huxley It has the advantage of being correlative to *neurosis* (the name applied by the same author to the corresponding nerve process) and is moreover technical and devoid of partial implications But it has no verb or other grammatical form allied to it The expressions affection of the soul ' modification of the ego are clumsy like state of consciousness and they implicitly assert theories which it is not well to embody in terminology before they have been openly discussed and approved Idea is a good vague neutral word and was by Locke employed in the broadest generic way but notwithstanding his authority it has not domesticated itself in the language so as to cover bodily sensations and it moreover has no verb Thought would be by far the best word to use if it could be made to cover sensations It has no opprobrious connotation such as feeling has and it immediately suggests the omnipresence of cognition (or reference to an object other than the mental state itself) which we shall soon see to be of the mental life s essence But can the expression ' thought of a toothache ever suggest to the reader the actual present pain itself? It is hardly possible and we thus seem about to be forced back on some *pair* of terms like Hume s impression and idea or Hamilton s presentation and representation or the ordinary feeling and thought if we wish to cover the whole ground

In this quandary we can make no definitive choice but must according to the convenience of the context use sometimes one sometimes another of the synonyms that have been mentioned *My own partiality is for either* FEELING *or* THOUGHT I shall probably often use both words in a wider sense than usual and alternately startle two classes of readers by their unusual sound but if the connection makes it clear that mental states at large irrespective of their kind are meant this will do no harm and may even do some good [1]

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Some authors take high ground here and claim for it a sort of infallibility Thus Ueberweg

> When a mental image as such is the object of my apprehension there is no meaning in seeking to distinguish its existence in my consciousness (in me) from its existence out of my consciousness (in itself) for the object apprehended is in this case one which does not even exist as the objects of external perception do in itself outside of my consciousness It exists only within me [2]

[1] Compare some remarks in Mill s *Logic* bk i chap iii §§ 2 3

[2] *Logic* § 40

I — hem has momentarily detracted from their force[1] — of the introspective ea on to think it has s the ground actually never yet deceived us we migh — maintained by Herr Mohr

The illus o s of our senses [says this auth r] have undermined our belief in the reality of the outer world but in the sphere of inner observation our confidence is in tact f r w have never found urselves t be in error about the reality of an act of thought or feeling We have ever been misled into thinking we were ot in d bt or in anger w en the conditions were really states of our consciousness.

But sound as the reasoning here would be were the premises correct I fear the latter cannot pass However it may be with such tron feelings as doubt or anger about weaker feelings and about the *rela ions to each o her* of all feelings we find ourselves in continual error and uncertainty so soon as we are called on to name and class and not merely to feel. Who can be ure of the exact *order* of his feelings when they are excessively rap d? Who can be sure in his sensible perception of a chair how much comes from the eye and how much is supplied out of the previous knowledge of the mind Who can compare with precision the *quantities* of disparate feelings even where the feelings are very nce where an object is felt now against the back and now h ere that two briefer or knows of many actions for what motive they were u t all Who can enumerate all the distinct ingredients of such a complicated feelin as *c er?* and who can tell offhand whether o no a perception of *dis nce* be a compound or a imple state of mind The whole mind stuff controversy would stop if we could decide conclusively by introspection that what seem to us elementary feelings are really elementary and not compound

Mr Sull in his work on Illusion has a chapter on those of Introspection from which we mi ht now quote But, ince the rest of this volume will be little mo e than a collection of illustrations of the difficulty of discovering by direct introspection exactly what our feelings and their relations are we need not anticipate our own futu e detail but just state our general conclusion that i — *l th t of all* to tell ription more applicable to some other sort of thin The onl safeguard is in the final *consensus* of our farther knowledge about the thing in question later views correcting earlier ones until at Last the harmony of a consistent system is reached. uch a system gradually wo ked out, is the best guarantee the psychol

In cases like t , where t stat outlasts t ct f naming it, exists bef re t, and recurs en it is past, w probably run little practical risk f erro when w talk as if th stat knew sel The sta f feeling and the stat f naming the feeling are co tin us, and th infallibility f such prom t introspective judgments is proba l great. But even here th certainty f ur knowledge ou t not t be argued the priori ground that percipi and esse re in psychology the same The sta es are really two t naming stat and the named sta are part percipi is esse is t the principle that pplies.

[1] Mohr *Grundzüge der Empirischen Psychologie* (Leipzig, 53) p. 47

ing were probably scholastic ones such as principles of internal activity the faculties the ego the *liberum arbitrium indifferentiæ* etc John Mill in replying to him [1] says

It might have occurred to M Comte that a fact may be studied through th m d m of memory not at the very mom t of

n the act is past h t h s

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stroys the w ... we are directly aware of we can directly observe

Where now does the truth lie? Our quotation from Mill is obviously the one which expresses the most of *practical* truth about the matter Even the writers who insist upon the absolute veracity of our immediate inner apprehension of a conscious state have to contrast with this the fallibility of our *memory* or *observation* of it a moment later No one has emphasized more sharply than Brentano himself the difference between th mm d

and

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chol ... a infallible ones But the psychologist must not only *have* his mental states in their absolute veritableness he must report them and write about them name them classify and compare them and trace their relations to other things Whilst alive they are their own property it is only *post mortem* that they become his prey [2] And as in th n ming classing and knowing of thin ... not also here? Comte is quite righ ... to be named judged or perceiv ... any past No subjective state whilst present is its own object its object is always something else There are it is true cases in which we appear to be naming our present feeling and so to be experiencing and observing the same inner fact at a single stroke as when we say I feel tired I am angry etc But these are illusory and a little attention unmasks the illusion The present conscious state when I say I feel tired is not the direct state of tire when I say I feel angry it is not the direct state of anger It is the state of *saying I feel tired* of *saying I feel angry* —entirely different matters so different that the fatigue and anger apparently included in them are considerable modifications of the fatigue and anger directly felt th n s

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results have as yet borne little theoretic fruit commensurate with the great ... But facts are facts and if we only get ... to year ... method ... of mere

work done

The *comparative method* finally supplements the introspective and experimental methods This method pre-supposes a normal psychology of introspection to be established in its main features But where the origin of these features or their dependence upon one another is in question it is of the utmost importance to trace the phenomenon considered through all its possible variations of type and combination So it has come to pass that instincts of animals are ransacked to throw light on our own and that the reasoning faculties of bees and ants the minds of savages infants madmen idiots the deaf and blind criminals and eccentrics are all invoked in support of this or that special theory about some part of our own mental life The history of sciences moral and political institutions and languages as types of mental product are pressed into the same service Messrs Darwin and Galton have set the example of circulars of questions sent out by the hundred to those supposed able to reply The custom has spread and it will be well for us in the next generation if such circulars be not ranked among the common pests of life Meanwhile information grows and results emerge There are great sources of error in the comparative method The interpretation of the psychoses of animals savages and infants is necessarily wild work in which the personal equation of the investigator has things very much its own way A savage will be reported to have no moral or religious feeling if his actions shock the observer unduly A child will be assumed without self-consciousness because he talks of himself in the third person etc etc No rules can be laid down in advance Comparative observations to be definite must usually be made to test some pre-existing hypothesis and the only thing then is to use as much sagacity as you possess and to be as candid as you can

The Sources of Error in Psychology

The first of them arises from the misleading influence of speech Language was originally made by men who were not psychologists and most men to-day employ almost exclusively the vocabulary of outward things The cardinal passions of our life anger love fear hate hope and the most comprehensive divisions of our intellectual activity to remember expect think know dream with the broadest genera of æsthetic feeling joy sorrow pleasure pain are the only facts of a subjective order which this vocabulary deigns to note by special words The elementary qualities of sensation bright loud red blue hot cold are it is true susceptible of being used in both an objective and a subjective sense They stand for outer qualities and for the feelings which these arouse But the objective sense is the original sense and still to-day we have to describe a large number of sensations by the name of the object from which they have most frequently been got An orange color an odor of violets

ogist can give for the soundness of any particular psychologic observation which he may report Such a system we ourselves must strive as far as may be to attain

The English writers on psychology and the school of Herbart in Germany have in the main contented themselves with such results as the immediate introspection of single individuals gave and shown what a body of doctrine they may make The works of Locke Hume Reid Hartley Stewart Brown the Mills will always be classics in this line and in Professor Bain s *Treatises* we have probably the last word of what this method taken mainly by itself can do —the last monument of the youth of our science still untechnical and generally intelligible like the chemistry of Lavoisier or anatomy before the microscope was used

The Experimental Method But psychology is passing into a less simple phase Within a few years what one may call a microscopic psychology has arisen in Germany carried on by experimental methods asking of course every moment for introspective data but eliminating their uncertainty by operating on a large scale and taking statistical means This method taxes patience to the utmost and could hardly have arisen in a country whose natives could be *bored* Such Germans as Weber Fechner Vierordt and Wundt obviously cannot and their success has brought into the field an array of younger experimental psychologists bent on studying the *elements* of the mental life dissecting them *out from the gross results in which they are embedded and as far as possible* reducing them to quantitative scales The simple and open method of attack having done what it can the method of patience starving out and harassing to death is tried the mind must submit to a regular *siege* in which minute advantages gained night and day by the forces that hem her in must sum themselves up at last into her overthrow There is little of the grand style about these new prism pendulum and chronograph philosophers They mean business not chivalry What generous divination and that superiority in virtue which was thought by Cicero to give a man the best insight into nature have failed to do their spying and scraping their deadly tenacity and almost diabolic cunning will doubtless some day bring about

No general description of the methods of experimental psychology would be instructive to one unfamiliar with the instances of their application so we will waste no words upon the attempt *The principal fields of experimentation* so far have been 1) the connection of conscious states with their physical conditions including the whole of brain physiology and the recent minutely cultivated phy*siology of the sense-organs together with* what is technically known as psycho physics or the laws of correlation between sensations and the outward stimuli by which they are aroused 2) the analysis of space perception into its sensational elements 3) the measurement of the *duration* of the simplest mental processes 4) that of the *accuracy of reproduction* in the memory of sensible experiences and of intervals of space and time 5) that of the manner [illegible] *other* call each other up or in [illegible] the *number of facts* which con[illegible] 7) that of the elementary laws of oblivescence and retention It must be said that in some of these fields the

have been introduced into our cience by this means The so-called question of presentative or representative perception of whether an object is present to the thou ht that thinks it by a counterfeit ima e of itself or directly and without any intervenin image at all the question of nominalism and conceptualism of the shape in wh ch things are present when only a general notion of them is before the mind are comparatively easy questions when once the psychologist s fallacy is eliminated from their treatment —as we shall ere long ee (in Chapter XII)

Another variety of the psychologist s fallacy is the assumption that the mental state studied must be co scious of itself as the psycholo ist is conscious of it Th m —

— u u uv is o u object what the psychologist sees is the thou ht s object plus the thou ht itself plus possibly all the rest of the world We must be very careful the efore in discussin a state of mind from the psychologist s point of view to avoid foistin into its own ken matters that are only there for ours We must avo d substitutin what we know the consciousness *is* for what it is a consc ousness *of* and countin its outward and so to speak phys cal relations with other facts of the world in among the objects of which we set it down as aware Crude as such a confusion of standpoi t m —

—

— t be too watchful against its subtly corrupting influence

Summa y To sum up the chapter psychology assumes that thou hts successively occur and that they know objects in a world which the psychologist also knows *These thoughts are the subject i e data of which he treats and their relations to thei objects to the bra n and to the rest of the world const t t the subject matter of psych l*

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a cheesy taste a thunderous sound a fiery smart etc will recall what I mean This absence of a special vocabulary for subjective facts hinders the study of all but the very coarsest of them Empiricist writers are very fond of emphasizing one great set of delusions which language inflicts on the mind Whenever we have made a word they say to denote a certain group of phenomena we are prone to suppose a substantive entity existing beyond the phenomena of which the word shall be the name But the *lack* of a word quite as often leads to the directly opposite error We are then prone to suppose that no entity can be there and so we come to overlook phenomena whose existence would be patent to us all had we only grown up to hear it familiarly recognized in speech [1] It is hard to focus our attention on the nameless and so there results a certain vacuousness in the descriptive parts of most psychologies

But a worse defect than vacuousness comes from the dependence of psychology on common speech Naming our thought by its own objects we almost all of us assume that as the objects are so the thought must be The thought of several distinct things can only consist of several distinct bits of thought or ideas that of an abstract or universal object can only be an abstract or universal idea As each object may come and go be forgotten and then thought of again it is held that the thought of it has a precisely similar independence self identity and mobility The thought of the object s recurrent identity is regarded as the identity of its recurrent thought and the perceptions of multiplicity of coexistence of succession are severally conceived to be brought about only through a multiplicity a coexistence a succession of perceptions The continuous flow of the mental stream is sacrificed and in its place an atomism a brickbat plan of construction is preached for the existence of which no good introspective grounds can be brought forward and out of which presently grow all sorts of paradoxes and contradictions the heritage of woe of students of the mind

These words are meant to impeach the entire English psychology derived from Locke and Hume and the entire German psychology derived from Herbart so far as they both treat ideas as separate subjective entities that come

fusion of his own standpoint with that of the mental fact about which he is making his report I shall hereafter call this the psychologist s fallacy *par excellence* For some of the mischief here too language is to blame The psy

that object He himself mean gets easily led to suppose that way in which he knows it al though this is often very far from being the case [2] The most fictitious puzzles

continuous to itself by an illusion analogous to that of the zoetrope? Or is it at most times as cont nuous outwardly as it inwardly seems?

It must be confessed that we can give no ri orous answer to this question Cartesians who hold that the *essence* of the soul is to think can of course solve — f thoughtless intervals either by lapses

es_ence one is free to take the appe... admit that the mind as well as the body may go to sleep

Locke was the first prominent champion of this latter view and the pages in which he attacks the Cartesian belief are as spirited as any in his *Essay* Every drowsy nod shakes their doctrine who teach that their soul is always thinking He will not believe that men so easily forget M Jouffroy and Sir W Hamilton attacking the question in the same empirical way are led to an opposite conclusion Their reasons briefly stated are these

— nd ced there is often a great display of in
ion of all that has passed
p however profound we always
ommon dreams are often remem
en irretrievably lost

Frequently when awake and absent minded we are visited by thoughts and images which the next instant we cannot recall

Our insensibility to habitual noises etc whilst awake proves that we can neglect to attend to that which we nevertheless feel Similarly in sleep we grow inured and sleep soundly in presence of sensations of sound cold contact etc. which at first prevented our complete repose We have learned to neglect them whilst asleep as we should whilst awake The mere *sense impress ons* are the same when the sleep is deep as when it is light the difference must lie in a *judgment* on the part of the apparently slumbering mind that they are not worth noticing

This discrimination is equally shown by nurses of the sick and mothers of infants who will sleep throu h much noise of an irrelevant sort but waken at the sl ghtest stirring of the patient or the babe This last fact shows the *sense orga* to be pervious for sounds

Many people ha e a remarkable faculty of registering when asleep the flight of time They will habitually wake up at the same minute day after day or will wake punctually at an unusual hour determined upon overnight How can this knowledge of the hour (more accurate often than anything the waking con sciousness shows) be possible without mental activity during the interval?

Such are what we may call the classical reasons for admitting that the mind is active even when the person afterwards ignores the fact Of late years or

That th ppeara ce l mental ctivity here is real can be pro ed by ggesting t the "hypn tized somnambulist that h shall remember wh h wakes. H will then ft d so F m re details *J M lebra ch R h d la vrité* bk III, ch p I J Lock *Es y Concerning H m U der t ding* book II, ch C W If *Psy h l t nalis* § 59 Sir W Hamil *Lectur on M t ph* lect re XVII J Bascom *Science f Mind* § Th J uf froy d Sommeil, *Mčla g Phil* H. H lland, *Ch pter Mental Physiol* p 80 B

Chapter VIII

THE RELATIONS OF MINDS TO OTHER THINGS

SINCE for psychology, a mind is an object in a world of other objects, its relation to those other objects must next be surveyed First of all, to its

Time Relations

Minds as we know them are temporary existences Whether my mind had a being prior to the birth of my body whether it shall have one after the latter s decease are questions to be decided by my general philosophy or theology rather than by what we call scientific facts —I leave out the facts of so-called spiritualism as being still in dispute Psychology as a natural science confines itself to the present life in which every mind appears yoked to a body through which its manifestations appear In the present world then minds precede succeed and coexist with each other in the common receptacle of time and of their *collective* relations to the latter nothing more can be said The life of the *individual* consciousness in time seems however to be an interrupted one so that the question

Are we ever wholly unconscious?

becomes one which must be discussed Sleep fainting coma epilepsy and other unconscious conditions are apt to break in upon and occupy large durations of what we nevertheless consider the mental history of a single man And the fact of interruption being admitted is it not possible that it may exist where we do not suspect it, and even perhaps in an incessant and fine grained form?

This might happen, and yet the subject himself never know it We often take ether and have operations performed without a suspicion that our consciousness has suffered a breach The two ends join each other smoothly over the gap and only the sight of our wound assures us that we must have been living through a time which for our immediate consciousness was non existent Even in sleep this sometimes happens we think we have had no nap and it takes the clock to assure us that we are wrong [1] We thus may live through a real outward time a time known by the psychologist who studies us and yet not *feel* the time or infer it from any inward sign The question is how often does this happen? Is consciousness really discontinuous incessantly interrupted and recommencing (from the psychologist s point of view)? and does it only seem

[1] Messrs Payton Spence (*Journal of Spec Phil* x p 338 xiv p 286) and M M Garver (*Amer Journ of Science* 3d series xx p 189) argue the one from speculative the other from experimental grounds that the physical condition of consciousness being neural vibration the consciousness must itself be incessantly interrupted by unconsciousness—about fifty times a second according to Garver

cut off from the primary or normal one but susceptible of bein *tapped* and made to testify to its existence in various odd ways

Chief amongst these is what M Janet calls the method of *distraction*." These hysterics are apt to possess a very narrow field of attention and to be unable to think of more than one thing at a time When talking with any person they forget everything else When Lucie talked directly with any one says M Janet she ceased to be able to hear any other person You may stand behind her call her by name shout abuse into her ears without making her turn round or place yourself before her show her objects touch her etc. without attracting her notice When finally she becomes aware of you she thinks you have just come into the room again and greets you accordingly This singular forgetfulness makes her liable to tell all her secrets aloud unrestrained by the presence of unsuitable auditors

... ed in several subjects like this that if he came up behind ... and addressed ... other simple ... intelligence was quite unconscious of recei ... to another he made them repl by ... ions to his whispered questions and finally made them ... cil were placed in their hand The primary conscious- ... these per ... er these latter appeared in its turn to be q ... per consciousness s concerns This *proof by automatic writing* of a secondary consciousness s existence is the most cogent and striking one but a crowd of other facts prove the same thin If I run through them rapidl the reader will probabl be convinced

The apparently anæsthetic hand of these subjects for one thing *will often adapt itself discriminatingly* to whatever object may be put into it. With a pencil it will make writing movements into a pair of scissors it will put its fingers and will open and shut them etc., etc. The primary consciousness so to call it is meanwhile unable to say whether or no a ... is in the hand if the latter be hidden from sight I put a pair of eyeglasses into Leonie s anæsthetic hand this hand opens it and raises it towards the nose but half way thither it enters the field of vision of Leonie who sees it and stops stupefied Why says she I have an eyeglass in my left hand! M Binet found a very curious sort of connection between the apparentl anæsthetic skin and the mind in some Salpetriere-subjects Things placed in the hand were not felt but *thought* of (apparently in visual terms) and in no wise referred by the subject to their starting point in the hand s sensation. A key a knife placed in the hand occasioned *ideas* of a key or a knife but the hand felt nothing Similarly the subject *thought of* the number 3 6 etc., if the hand or finger was bent three or six times by the operator or if he stroked it three six etc., times

In certain individuals there was found a still odder phenomenon which reminds one of that curious idiosyncrasy of colored hearing " of which a few cases have been latel described with great care by foreign writers These individuals namel saw the impression received by the hand but could not feel it and the thing seen appeared by no means associated with the hand but more

rather one may say of late months they have been reinforced by a lot of curi ous observations made on hysterical and hypnotic subjects which prove the existence of a highly developed consciousness in places where it has hitherto not been suspected at all These observations throw such a novel light upon human nature that I must give them in some detail That at least four different and in a certain sense rival observers should agree in the same conclusion justifies us in accepting the conclusion as true

'Unconsciousness" in Hysterics

One of the most constant symptoms in persons suffering from hysteric dis ease in its extreme forms consists in alterations of the natural sensibility of various parts and organs of the body Usually the alteration is in the direction of defect or anæsthesia One or both eyes are blind or color blind or there is hemianopsia (blindness to one half the field of view) or the field is contracted Hearing taste smell may similarly disappear in part or in totality Still more striking are the cutaneous anæsthesias The old witch finders looking for the devil s seals learned well the existence of those insensible patches on the skin of their victims to which the minute physical examinations of recent medi cine have but recently attracted attention again They may be scattered any where but are very apt to affect one side of the body Not infrequently they affect an entire lateral half from head to foot and the insensible skin of say the left side will then be found separated from the naturally sensitive skin of the right by a perfectly sharp line of demarcation down the middle of the front and back Sometimes most remarkable of all the entire skin hands feet face everything and the mucous membranes muscles and joints so far as they can be explored become *completely* insensible without the other vital functions becoming gravely disturbed

These hysterical anæsthesias can be made to disappear more or less com pletely by various odd processes It has been recently found that magnets plates of metal or the electrodes of a battery placed against the skin have this peculiar power And when one side is relieved in this way the anæsthesia is often found to have transferred itself to the opposite side which until then was well Whether these strange effects of magnets and metals be due to their di rect physiological action or to a prior effect on the patient s mind (expectant attention or suggestion) is still a mooted question A still better awakener of sensibility is the hypnotic trance into which many of these patients can be very easily placed and in which their lost sensibility not infrequently becomes entirely restored Such returns of sensibility succeed the times of insensibility and alternate with them But Messrs Pierre Janet[1] and A Binet[2] have shown that during the times of anæsthesia and coexisting with it *sensibility to the anæsthetic parts is also there in the form of a secondary consciousness* entirely

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lap with cards each bearing a number
ild *not see* any card whose number was
so-called post hypnotic suggestion
now well known and for wh as a well adapted subject Accordin ly
when she was awakened and asked about the papers on her lap she counted and
sa d she saw those only whose number was not a multiple of 3 To the 12 18 9
etc she was blind But the *hand* when the sub-conscious self was interrogated
by the usual method of engrossin the upper self in another conversation wrote
that the only cards in Lucie s lap were those numbered 12 18 9 etc and on be-
in asked to pick up all the cards which were there picked up these and let the
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Sometimes the mutual ignorance of the selves lead to incidents which are strange enough The acts and movements performed by the sub-conscious self are withdrawn from the conscious one and the subject will do all sorts of incongruous things of which he remains quite unaware I order Lucie [by the method of *d stractio*] to make a *p ed de ne* and her hands go forthwith to the

like an independent vision which usually interested and surprised the patient Her hand being hidden by a screen she was ordered to look at another screen and *to tell of any visual image which might project itself thereon* *Numbers* [illegible] of times the insensible member [illegible] ponding to [illegible] ome when manipulated and finally objects placed in it would come but on the hand itself nothing would ever be felt Of course simulation would not be hard here but M Binet disbelieves this (usually very shallow) explanation to be a probable one in cases in question [1]

The usual way in which doctors measure the delicacy of our touch is by the *compass points* *Two points are normally felt as one whenever they are too close* together for discrimination but what is too close on one part of the skin may seem very far apart on another In the middle of the back or on the thigh less than 3 inches may be too close on the finger tip a tenth of an inch is far enough apart Now as tested in this way with the appeal made to the primary con *sciousness which talks through the mouth and seems to hold the field alone* a certain person s skin may be entirely anæsthetic and not feel the compass points at all and yet this same skin will prove to have a perfectly normal sensibility if the appeal be made to that other secondary or sub consciousness which ex presses *itself automatically by writing or by movements of the hand* M *Binet*, M Pierre Janet and M Jules Janet have all found this The subject whenever touched would signify one point or two points as accurately as if she were a normal person She would signify it only by these movements and of the movements themselves her primary self would be as unconscious as of the *facts they signified for what the submerged consciousness makes the hand do auto*matically is unknown to the consciousness which uses the mouth

Messrs Bernheim and Pitres have also proved by observations too compli cated to be given in this spot that the hysterical blindness is no real blindness at all *The eye of an hysteric which is totally blind when the other or seeing eye is* shut will do its share of vision perfectly well when *both* eyes are open together But even where both eyes are semi blind from hysterical disease the method of automatic writing proves that their perceptions exist only cut off from commu *nication with the upper consciousness* M *Binet has found the hand of his pa* tients unconsciously writing down words which their eyes were vainly endeavor ing to see i e to bring to the upper consciousness Their submerged con sciousness was of course seeing them or the hand could not have written as it did *Colors are similarly perceived by the sub conscious self* which the hysteri cally color blind eyes cannot bring to the normal consciousness Pricks burns and pinches on the anæsthetic skin all unnoticed by the upper self are recol lected to have been suffered and complained of as soon as the under self gets a chance to express *itself* by the passage of the subject into hypnotic trance

It must be admitted therefore that *in certain persons* at least *the total pos sible consciousness may be split into parts which coexist but mutually ignore*

[1] This whole phenomenon shows how an idea which remains itself below the threshold of a certain conscious self may occasion associative effects therein The skin sensati ns unfelt by the patient s *primary* consciousness awaken neve theless their usual visual associates therein.

and share the objects of knowledge between them More remarkable ... ct to one of the consciousnesses and ... ommon ... elf ... his ... ype ... bearing a number ... whose number was ... ypnotic suggestion now well known and for wh ... ubject Accordingly when she was awakened and asked about the papers on her lap she counted and said she saw those only whose number was not a multiple of 3 To the 12 18 9 etc he was blind But the *hand* when the sub-conscious self was interrogated by the usual method of engrossing the upper self in another conversation wrote ... were those numbered 12 18 9 etc and on be- ... let the ... he sub- ... y blind ... *dy cried out in* ... secondary per ...

... up the eye ... are ains possession sees feels or is able ...

secret of her deeper trance it had be ... *taise plaisanterie* he said to the secondary self—and the latter obeyed The way in which the various personages share the stock of possible sensations between them seems to be amusingly illustrated in this young woman When awake her skin is insensible everywhere except on a zone about the arm where she habitually wears a gold bracelet This zone has feeling but in the deepest trance when all the rest of her body feels this particular zone becomes absolutely anæsthetic

... mutual ignorance of the selves leads to incidents which are

like an independent vision which usually interested and surprised the patient. Her hand being hidden by a screen she was ordered to look at another screen and to tell of any visual image which might project itself thereon Numbers would then come corresponding to the number of times the insensible member was raised touched etc Colored lines and figures would come corresponding to similar ones traced on the palm the hand itself or its fingers would come when manipulated and finally objects placed in it would come but on the hand itself nothing would ever be felt Of course simulation would not be hard here but M Binet disbelieves this (usually very shallow) explanation to be a probable one in cases in question [1]

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gay matters The sobb_g over there remained no trace of this grief which seemed to h_ e been qu_te ub-conscious

The primary self often has to invent an hallucination by which to mask and hide from its own view the deeds which the other self is enactin Leonie 3[1] writes real letters whilst Léonie 1 believes that she is knitting or Lucie 3 really comes to the doctor s office whil_t Lucie 1 believes herself to be at home This ... the series of numbers when handed over ... e may for the time be lost to the nor... habet obediently to command the subject to her great stupefaction ... herself unable to recall it etc. Few things are more curious than these relations of mutual exclusion of which all gradations exist between the several partial consciousnesses

How far this splitting up of the mind into separate consciou_nesses may exist in each one of us is a problem M Janet holds that it is only possible where there is abnormal weakness and consequently a defect of unifying or co-ordinatin power An hysterical woman abandons part of her con_ciousness becau e she is too weak nervously to hold it together The abandoned part meanwhile may sol d f into a secondary or sub-con_cious self In a perfectly sound subject on ... nt keeps coming back ... es remains integrated ... ough to form subordi... ese latter is often very strikin The post hypnotic sub-consciou ne_s ... nk of nothing but the order which it last received the cataleptic sub-consciousness of nothin but the last pos tion imprinted on the limb M Janet could cause definitely circumscribed reddenin and tumefaction of the skin on two of his subjects by suggestin to them in hypnotism the hallucination of a mustard poultice of any special shape *J ai tout le temps pensé à votre sinapisme* says the subject when put back into trance after the sug_estion has taken effect A man \ whom M Janet operated on at lon intervals was betweenwhiles tampered with by another operator and when put to sleep again by M Janet said he was too far away to receive orders being in Algiers The other operator having su__ested that hallucinat on had forgotten to remove it before wakin the subject f om his trance and the poor passive trance personality had stuck for weeks in the stagnant dream Leonie s sub-conscious performances having been illustrated to a caller by a *pied de ne* executed with her left hand in the course of conve sati n when a year later she meets him again up goes the same hand to her nose again without Leonie s normal self su_pecting the fact

All these facts taken together form unquestionably the beginnin of an inquiry which is destined to throw a new li_ht into the very abysses of our nature It is f r that reason that I have cited them at such length in this early chapter of the book They p ove one thing conclusively namely that *we must never take a person s test mony however s ce e that he has felt noth ng as p oof pos tiv that no feeling has been there* It may have been there as part of the consciousness of a secondary personage of whose experiences the primary

[1] M. Janet design tes by umbers th diff re t personalities which th subject may display

kneel and even lie down on his face on the floor ha " ı
self to be ..
has seer
ample c ... age may be shared by the two selves A young woman who had been writing automatically was sitting with a pencil in her hand trying to recall at my request the name of a gentleman whom she had once seen She could only recollect the first syllable Her hand meanwhile without her knowledge wrote down the last two syllables In a perfectly healthy young man who can write with the planchette I lately found the hand to be entirely anæsthetic during the writing act I could prick it severely without the subject knowing the fact The *writing on the planchette* however accused me in strong terms of hurting the hand Pricks on the *other* (non writing) hand meanwhile which awakened strong protest from the young man s vocal organs were denied to exist by the self which made the planchette go[1]

We get exactly similar results in the so called post hypnotic suggestion It is a familiar fact th ... luring a trance to perform an act or to experi ... will when the time comes obey the comman ... the command registered? How is its performance so accurately timed? These problems were long a mystery for the primary personality remembers nothing of the trance or the suggestion and will often trump up an improvised pretext for yielding to th ...

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... —not knowing then what they wrote and having their upper attention fully engrossed by reading aloud talking or solving problems in m ... which they had rec
time yet to run bef ... refore to no automatism in the mechanical sense that such acts are due a self presides over them a split off limited and buried but yet a fully conscious self More than this the buried self often comes to the surface and drives out the other self whilst the acts are performing In other words the subject lapses into trance again when the moment arrives for execution and has no subsequent recollection of the act which he has done Gurney and Beaunis established this fact which has since been verified on a large scale and Gurney also showed that the patient became *suggestible* again during the brief time of the performance M Janet s observations in their turn well illustrate the phenomenon

I tell Lucie to keep her arms raised after she shall have awak ... the normal state wh ... them She goes cor ... arms are doing she ... and says very sincerely My hand are doing nothing they are just like yours I command her to weep and when awake she really sobs but continues in the midst of her tears to talk of very

1c p
2

kneel and even lie down on his face on the floor, he all the while believing him self to be standing beside his bed Such *bizarreries* sound incredible until one has seen their like Long ago without understanding it I myself saw a small ex ample of the way in which a person s knowledge may be shared by the two selves A young woman who had been writing automatically was sitting with a pencil in her hand trying to recall at my request the name of a gentleman whom she had once seen She could only recollect the first syllable Her hand mean while without her knowledge wrote down the last two syllables In a perfectly healthy young man who can write with the planchette I lately found the hand to be entirely anæsthetic during the writing act I could prick it severely with out the subject knowing the fact The *writing on the planchette* however ac cused me in strong terms of hurting the hand Pricks on the *other* (non writing) hand meanwhile which awakened strong protest from the young man s vocal organs were denied to exist by the self which made the planchette go[1]

We get exactly similar results in the so called post hypnotic suggestion It is a familiar fact that certain subjects when told during a trance to perform an act or to experience an hallucination after waking will when the time comes obey the command How is the command registered? How is its performance so accu rately timed? These problems were long a mystery for the primary personality remembers nothing of the trance or the suggestion and will often trump up an improvised pretext for yielding to the unaccountable impulse which possesses the man so suddenly and which he cannot resist Edmund Gurney was the first to discover by means of automatic writing that the secondary self is awake keeping its attention constantly fixed on the command and watching for the sig nal of its execution Certain trance subjects who were also automatic writers when roused from trance and put to the planchette —not knowing then what they wrote and having their upper attention fully engrossed by reading aloud talking or solving problems in mental arithmetic —would inscribe the orders which they had received together with notes relative to the time elapsed and the time yet to run before the execution[2] It is therefore to no automatism in the mechanical sense that such acts are due a self presides over them a split-off limited and buried but yet a fully conscious self More than this the buried self often comes to the surface and drives out the other self whilst the acts are performing In other words the subject lapses into trance again when the mo ment arrives for execution and has no subsequent recollection of the act which he has done Gurney and Beaunis established this fact which has since been

patient became *sug*

Janet s observations

I tell Lucie to keep her arms raised after she shall have awakened Hardly is she in the normal state when up go her arms above her head but she pays no attention to them She goes comes converses holding her arms high in the air If asked what her

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nand her to weep and

tears to talk of very

[1] See *Proceedings of American Society for Psychical Research* vol 1 p 548

[2] *Proceedings of the (London) Society for Psychical Research* May 1887 p 268 ff

one whom we are consulting can naturally give no account In hypnotic subjects (as we shall see in a later chapter) just as it is the easiest thing in the world to paralyze a movement or member by simple suggestion so it is easy to produce what is called a systematized anæsthesia by word of command A systematized anæsthesia means an insensibility not to any one element of things but to some one concrete thing or class of things The subject is made blind or deaf to a certain person in the room and to no one else and thereupon denies that that person is present or has spoken etc M P Janet s Lucie blind to some of the numbered cards in her lap (p 135) is a case in point Now when the object is simple like a red wafer or a black cross the subject although he denies that he sees it when he looks straight at it nevertheless gets a negative after image of it when he looks away again showing that the *optical impression* of it has been received Moreover reflection shows that such a subject must *distinguish the object from others like it in order to be blind to it* Make him blind to one person in the room set all the persons in a row and tell him to count them He will count all but that one But how can he tell *which* one not to count without recognizing who he is? In like manner make a stroke on paper or blackboard and tell him it is not there and he will see nothing but the clean paper or board Next (he not looking) surround the original stroke with other strokes exactly like it and ask him what he sees He will point out one by one all the new strokes and omit the original one every time no matter how numerous the new strokes may be or in what order they are arranged Similarly if the original single stroke to which he is blind be *doubled* by a prism of some sixteen degrees placed before one of his eyes (both being kept open) he will say that he now sees *one* stroke and point in the direction in which the image seen through the prism lies ignoring still the original stroke

Obviously then he is not blind to the *kind* of stroke in the least He is blind only to one individual stroke of that kind in a particular position on the board or paper—that is to a particular complex object and paradoxical as it may seem to say so he must distinguish it with great accuracy from others like it in order to remain blind to it when the others are brought near He discriminates it as a preliminary to not seeing it at all

Again when by a prism before one eye a previously invisible line has been made visible to that eye and the other eye is thereupon closed or screened *its* closure makes no difference the line still remains visible But if then the prism be removed the line will disappear even to the eye which a moment ago saw it and both eyes will revert to their original blind state

We have then to deal in these cases neither with a blindness of the eye itself nor with a mere failure to notice but with something much more complex namely an active counting out and positive exclusion of certain objects It is as when one cuts an acquaintance ignores a claim or refuses to be influenced by a consideration But the perceptive activity which works to this result is disconnected from the consciousness which is personal so to speak to the subject and makes of the object concerning which the suggestion is made its own private possession and prey [1]

[1] How to conceive of this state of mind is not easy It would be much simpler to understand the process if adding new strokes made the first one visible There would then be two different objects apperceived as totals—paper with one stroke paper with many strokes

The mother who is asleep to every sound but the stirrings of her babe evidently has the babe-portion of her auditory sensibility systematically awake Relatively to that the rest of her mind is in a state of systematized anæsthesia That department split off and disconnected from the sleeping part can none the less wake the latter up in case of need So that on the whole the quarrel between Descartes and Locke as to whether the mind ever sleeps is less near to solution than ever On *a priori* speculative grounds Locke s view that thought and feeling may at times wholly disappear seems the more plausible As glands cease to secrete and muscles to contract so the brain should sometimes cease to carry currents and with this minimum of its activity might well coexist a minimum of consciousness. On the other hand we see how deceptive are appearances and are forced to admit that a part of consciousness may sever its connections with other parts and yet continue to be On the whole it is best to abstain from a conclusion. The science of the near future will doubtless answer this question mo e wisely than we can now

Let us turn now to consider the

Relations of Consciousness to Space

This is the problem known in the history of philosophy as the *question of the seat of the soul* It has given rise to much literature but we must ourselves treat it very briefly Everything depends on what we conceive the soul to be an extended or an inextended entity If the former it may occupy a seat If the latte

uene er perceive that constellation but I am not *dy amically* present there I wo k no effects. To my brain however I am dynamically present inasmuch as my thoughts and feelings seem to react upon the processes thereof If then by the seat of the mind is meant nothing more than the locality with which it stands in immediate dynamic relations we are certain to be right in saying that its seat is somewhere in the cortex of the brain Descartes as is well known thought that the inextended soul was immediately present to the pineal gland Others as Lotze in his earlier days and W Volkmann thi k its position must be at some

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p esent both in the whole and in each and every part of the body This mode of presence is said to be due to the soul s inextended nature and to its implicity Two extended entities could only corre-

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other things misknow or ignore them and to find that they interest it in this fashion or in that

Now the *relation of knowing* is the most mysterious thing in the world If we ask how one thing can know another we are led into the heart of *Erkenntniss theorie* and metaphysics The psychologist for his part does not consider the

conclude that those other thoughts know it after their fashion even as he knows it after his Knowledge becomes for him an ultimate relation that must be admitted whether it be explained or not just like difference or resemblance which no one seeks to explain.

Were our topic Absolute Mind instead of being the concrete minds of individuals dwelling in the natural world we could not tell whether that Mind had the function of knowing or not, as knowing is commonly understood We might learn the complexion of its thoughts but as we should have no realities outside of it to compare them with —for if we had the Mind would not be Absolute — we could not criticise them and find them either right or wron and we should have to call them simply the thoughts and not the *knowledge* of the Absolute Mind Finite minds however can be judged in a different way because the psychologist himself can go bail for the independent reality of the objects of which they think He knows these to exist outside as well as inside the minds in question he thus knows whether the minds think and *know* or only think and thou h his knowledge is of course that of a fallible mortal there is nothing in the conditions that should make it more likely to wrong in this case than in any other

Now by what tests does the psychologist dec d wh h

t resembling his idea of it it seems to imply that reality and refer to t by operating upon it through the bodily organs or even I t resembles and operates on some other reality that implies and leads up to and terminates in the first one — h these cases the p irectly or remotely and position in the under examination ne ther resem m to the psychologist he calls it a of no cognitive worth If again it knows them but alto ether fail to producing bodily motions which the psych logist sees then the psychologist, like all of us may be in doubt Let the mental state for example occur during the sleep of its subject. Let the latter dream of the death of a certain man and let the man simultaneously die Is the dream a mere coincidence or a veritable cognition of the death? Such puzzling cases are what the societies for Psychical Research are collecting and trying to interp et in the most reasonable way

If the dream were the only one of the kind the subject ever had in his life if

spond in space with one another part to part—but not so does the soul which has no parts correspond with the body Sir Wm Hamilton and Professor Bowen defend something like this view I H Fichte III hi losoph M le

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theosophic doctrines of the present day and carry us back to times when the soul as a vehicle of consciou s not discriminated as it now is f

ely Aristo t

principle is extended we neither know its form nor its seat whilst if unextended it is absurd to speak of its having any space relations at all Space relations we shall see hereafter to e things The only objects th s

perceived of n

y are dynamic to talk of the soul being present is only a figure of speech Hamilton s doctrine that the soul is present to the whole body is at any rate false for cognitively its presence extends far beyond the body and dynamically it does not extend beyond the brain [3]

The Relations of Minds to Other Objects

are either relations to *other minds* or to *material things* The material things are either the mind s *own brain* on the one hand or *anything else* on th oth e relations of a mind to its o n

the brain are *cognitive and emotional* relations exclusively so far as we know It *knows* them and it inwardly *welcomes or rejects* them but it h When it seems

that it *can* do *directly* is to know

[1] *Perception of Space and Matter* 18 9 pt II chap 3

[2] For a very good cond ns d hist ry f the var u p ons see W V lkm nn v n V lkmar *L hrbuch d Psycholog e* § 6 Sir W Hamilt n a given in

at. Lotze is th nly ne wl concern d ab ut it and his views ha e va ied *Cf M d ische Psychol* § 10 *Mic cosmus* bk III ch 2 *Met phy c* bk III ch 5 *O tl e of Psychol* part II ch 3 See also G T Fechner *Psychophy k* chap XXXVII

[4] I purposely ignore clai voy nce and action upon distant things by mediums as not yet matters of common consent.

totally unlike [th] thought but which by v rtue of the same my sterious order act as a eries of incitem nts upon the hearer so that he constructs within himself the cor ts in availing himself of the
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we must c nstruct t in thought and tha
unf lding of the mind s inner nature By describing the mind as a waxen tablet, and things as impressing themsel es upon it, we seem to g t great insight until we think to ask whe e this extended tablet s and how things stamp themselves on it and h w the pe cep m if they did. The immediate ante-
edents of sen
Whatever we l
changes. But t
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of p tures impre si ns e
s ch figures any meanin
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in physics and the senses
labyrinth whe e the bj
totally unlike anything but themsel es
skull. The object has go e compl tely and knowled e has not yet appeared. Nervous sign a e the raw mat rial of all kn wl dge f the oute w ld acc rding to the most decided ealism But in order to pass beyond these s gns into a knowledge of the o nt rpreter who shall read back these signs into their
o
t

f the m d s own at r e. All reacti s f this sort it exp esses the nature of

eption the uni erse as t appears are pu ely phen menal, being but the w y in which the mind reacts gainst the ground of ts sensations.

The dualism of Object and Subject and their pre-established harmony are wh t the psycholo ist as such must assume whatever ulterior monistic philosophy he may as an ind dual who has the right also to be a metaphys cian have in eserve I hope that this general point is now made clear so that we may leave it and descend to some distinctions of detail

B P B wn *M t physics* pp 4 7 *Cf* also Lotz *Log k* §§ 308 pp 3 6– 7

the context of the death in the dream differed in many particulars from the real death s context and if the dream led to no action about the death unquestionably we should all call it a strange coincidence and naught besides But if the death in the dream had a long context agreeing point for point with every feature that attended the real death if the subject were constantly having such dreams all equally perfect and if on awaking he had a habit of acting immediately as if they were true and so getting 'the start of his more tardily informed neighbors —we should probably all have to admit that he had some mysterious kind of clairvoyant power that his dreams in an inscrutable way knew just those realities which they figured and that the word coincidence failed to touch the root of the matter And whatever doubts any one preserved would completely vanish if it should appear that from the midst of his dream he had the power of *interfering* with the course of the reality and making the events in it turn this way or that according as he dreamed they should Then at least it would be certain that he and the psychologist were dealing with the *same* It is by such tests as these that we are convinced that the waking minds of our fellows and our own minds know the same external world

The psychologist s attitude towards cognition will be so important in the sequel that we must not leave it until it is made perfectly clear *It is a thorough going dualism* It supposes two elements mind knowing and thing known and treats them as irreducible Neither gets out of itself or into the other neither in any way *is* the other neither *makes* the other They just stand face to face in a common world and one simply knows or is known unto its counterpart This singular relation is not to be expressed in any lower terms or translated into any more intelligible name Some sort of *signal* must be given by the thing to the mind s brain or the knowing will not occur—we find as a matter of fact that the mere *existence* of a thing outside the brain is not a sufficient cause for our knowing it it must strike the brain in some way as well as be there to be known But the brain being struck the knowledge is constituted by a new construction that occurs altogether *in* the mind The thing remains the same whether known or not [1] And when once there the knowledge may remain there whatever becomes of the thing

By the ancients and by unreflecting people perhaps today knowledge is explained as the *passage* of something from without into the mind—the latter so far at least as its sensible affections go being passive and receptive But even in mere sense impression the duplication of the object by an inner construction must take place Consider with Professor Bowne what happens when two people converse together and know each other s mind

> No thoughts leave the mind of one and cross into the mind of the other When we peak of an exchange of thought even the crudest mind knows that this is a mere figure of speech To perceive another s thought we must construct his thought within ourselves this thought is our own and is strictly original with us At the same time we owe it to the other and if it had not originated with him it would probably not have originated with us But what has the other done? This by an entirely mysterious world-order the peaker is enabled to produce a eries of signs which are

[1] I disregard *conseq e ces* which may later come to the thing from the fact that it is known. The knowing *per se* in no wise affects the thing

distinction between the mere mental having or feeling of an object and the thinking of it portends

The mental states usually distinguished as feelings are the *emotions* and the *sensations* we get from skin muscle viscus eye ear nose and palate The thoughts as recognized in popular parlance are the *conceptions* and *judgments* When we treat of these mental states in particular we shall have to say a word about the cognitive function and value of each It may perhaps be well to notice now that our senses only give us acquaintance with facts of body and that of the mental states of other persons we only have conceptual knowledge Of our own past states of mind we take cognizance in a peculiar way They are objects of memory and appear to us endowed with a sort of warmth and intimacy that makes the perception of them seem more like a process of sensation than like a thought

There are two kinds of knowledge broadly and practically distinguishable we may call them respectively *knowledge of acquaintance* and *knowledge about* Most languages express the distinction thus γνωναι, ειδεναι noscere scire kennen wissen connaitre savoir[1] I am acquainted with many people and things which I know very little about except their presence in the places where I have met them I know the color blue when I see it and the flavor of a pear when I taste it! I know an inch when I move my finger through it a second of time when I feel it pass an effort of attention wh n I m l i difference between two th ~

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ι ol d its highest genera the simple qualities of matter and mind together with the kinds of relation that subsist between them must either not be known at all or known in this dumb way of acquaintance without *knowledge about* In minds able to speak at all there is it is true *some* knowledge about everything Things can at least be classed and the times of their appearance told But in general the less we analyze a thing and the fewer of its relations we perceive the less we know about it and the more our familiarity with it is of the acquaintance type The two kinds of kno l d therefore as the human m nd ~

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The grammatical sentence expresses this Its subject stands for an object of acquaintance which by the addition of the predicate is to get something known about it We may already know a good deal when we hear the subject named—its name may have rich connotations But know we much or little then we know more still when the sentence is done We can relapse at will into a mere condition of acquaintance with n h ttention and staring ge *about* it by rally What we are only

~ *y present* to our minds we *ha e* it or the idea of it But when we know about it we do more than merely have it we seem as we think over its relations to subject it to a sort of *treatment* and to *operate* upon it with our thought The words *feeling* and *thought* give voice to the antithesis Through feelings we become acquainted with things but only by our thoughts do we know about them Feelings are the germ and starting point of cognition thoughts the developed tree The minimum of grammatical subject of objective presence of reality known about the mere beginning of knowledge must be named by the word that says the least Such a word is the interjection as *lo! there! ecce! voilà!* or the article or demonstrative pronoun introducing the sentence as *the it that* In Chapter XII we shall see a little deeper into what this

[1] *Cf* John Grote *Expl t o Philosoph ca* p 60 H H lmholtz *P pular S e t fic Lectures* London pp 308–309

1 *Thought tends to personal form*

of philosophic tasks This task we must confront in the next chapter here a preliminary word will suffice

In this room—this lecture-room say—there are a multitude of thoughts yours and mine some of which cohere mutually and some not They are as little each for itself and reciprocally independent as they are all belonging together They are neither no one of them is separate but each belongs with certain others and with none beside My thought belon s with my other thoughts and your thou ht with your other thoughts Whether anywhere in the room there be a mere thought which is nobody s thought we have no means of ascertaining for we have no experience of its like The only states of consciousness that we naturally deal with are found in personal consciousnesses minds selves concrete particular I s and you s

Each of these minds keeps its own thou hts to itself There is no giving or barterin between them No thou ht even comes into direct *s ght* of a thought in another personal consciousness than its own Absolute insulation irreducible pluralism is the law It seems as if the elementary psychic fact were not *thought* or *th s thought* or *that thought* but *my thought* every thou ht being *owned* Neither contemporaneity nor proximity in space nor similarity of quality and co tent are able to fuse thou hts together which are sundered by this barrier of belo ging to different personal minds The breaches between such thou hts are the most absolute breaches in nature Everyone will recognize this to be true so long as the existence of *som th* nal mind is ing implied eated as the ot feelings at any rate si nce of personal selves The worst a psychology can do is so to interpret the nature of these selves as to rob them of their worth A F ench writer speakin of our ideas says somewhere in a fit of anti spiritualistic excitement that misled by certain peculiarit es which they display we end by personifying the procession wh ch they make —such personification being regarded by him as a great philosophic blunder on our part It could only be a blunder if the notion of personality meant somethin essentially different from anything to be found in the mental procession But if that procession be itself the very original of the notion of personality to personify it cannot possibly be wro g It is already personified There are no marks of personality to be gathered *al unde* and then found lacking in the train of thought It has them all already so that to whatever farther analysis we may subject that form of personal selfhood under which thoughts appear it is and must remain true that the thoughts which psychology studies do continually tend to appear as parts of personal selves

I say tend to appear' rather than appear on account of those facts of sub-

B P B w *M i phy ics* p 36

Chapter IX

THE STREAM OF THOUGHT

We now begin our study of the mind from within Most books start with sensations as the simplest mental facts and proceed synthetically constructing each higher stage from those below it But this is abandoning the empirical method of investigation No one ever had a simple sensation by itself Consciousness, from our natal day is of a teeming multiplicity of objects and relations and what we call simple sensations are results of discriminative attention pushed often to a very high degree It is astonishing what havoc is wrought in psychology by admitting at the outset apparently innocent suppositions that nevertheless contain a flaw The bad consequences develop themselves later on and are irremediable being woven through the whole texture of the work The notion that sensations being the simplest things are the first things to take up in psychology is one of these suppositions The only thing which psychology has a right to postulate at the outset is the fact of thinking itself and that must first be taken up and analyzed If sensations then prove to be amongst the elements of the thinking we shall be no worse off as respects them than if we had taken them for granted at the start

The first fact for us then as psychologists is that thinking of some sort goes on I use the word thinking in accordance with what was said on p 122 for every form of consciousness indiscriminately If we could say in English it thinks as we say it rains or it blows we should be stating the fact most simply and with the minimum of assumption As we cannot we must simply say that *thought goes on*

Five Characters in Thought

How does it go on? We notice immediately five important characters in the process of which it shall be the duty of the present chapter to treat in a general way

1 Every thought tends to be part of a personal consciousness
2 Within each personal consciousness thought is always changing
3 Within each personal consciousness thought is sensibly continuous
4 It always appears to deal with objects independent of itself
5 It is interested in some parts of these objects to the exclusion of others and welcomes or rejects—*chooses* from among them in a word—all the while

In considering these five points successively we shall have to plunge *in medias res* as regards our vocabulary and use psychological terms which can only be adequately defined in later chapters of the book But every one knows what the terms mean in a rough way and it is only in a rough way that we are now to use them This chapter is like a painter s first charcoal sketch upon his canvas in which no niceties appear

happy it is in the summer land

Beneath these tracts of thou ht which however rudimentary are still organized selves with a memory habits and sense of their own identity M Janet thinks that the facts of catalepsy in hysteric patients drive us to suppose that there are thoughts quite unorganized and impersonal A patient in cataleptic trance (which can be produced artificially in certain hypnotized subjects) is without memory on waking and seems insensible and unconscious as long as the cataleptic condition lasts If however one raises the arm of such a subject t stays in that pos tion and the whole body can thus be moulded like wax under the hands of the operator retaining for a considerable time whatever attitude he communicates to it In hysterics whose arm for example is anæsthetic the same thing may happen The anæsthetic arm may remain passively in positions which it is made to assume or if the hand be taken and made to hold a pencil and trace a certain letter it will continue tracing that letter indefinitely on the paper These acts until rece tlv we e supposed to be accompanied by no consciousness at all they were physiological reflexes M Janet considers with much more plausibility that feeling escorts them The feeling is probably merely that of the position or movement of the limb and it produces no more than its natural effects when it discharges nto the motor centres which keep the position maintained or the movement incessantly renewed[2] Such thoughts as these says M Janet, are known by *no one* for disaggregated sensations reduced to a state of mental dust are not synthetized in any personality He admits however that these very same unutterably stupid thoughts tend to develop memory —the cataleptic ere long moves her arm at a bare hint so that they form no important exception to the law that all thought tends to assume the form of personal consciousness

2 *Thought is n constant change*

I do not mean necessarily that no one state of mind has any duration—even if true that would be hard to establish The chan e which I have more particularly in v ew is that which takes place in sensible intervals of time and the esult on which I wish to lay tress is this that *no state o ce gone can recur and be dent cal with what it was befo e* Let us begin with Mr Shadworth Hodgson s description

con ci us t ll. The chain of consci sness a sequen e of *d ff ent*

Cf A. Constans *Relation sur pid mie d'hy té o-dém patkie* 86 d ed., Paris, 863 Chap Franz lini *L Epid mia d'ist -d mon pat in Verz gnis* R ggio, 879 See also J Kerner kttl wo k, *Nachricht v dem Vork mm d Beses enseins* 836

F the physiol gy f this, compare th chapter n th Will. *Loc. cit* p. 3 6. *The Philo phy f R flection*, 2, pp. 48, 90.

conscious personality automatic writing etc of which we studied a few in the last chapter The buried feelings and thoughts proved now to exist in hysterical anæsthetics in recipients of post hypnotic suggestion etc themselves are parts of *secondary personal selves* These selves are for the most part very stupid and contracted and are cut off at ordinary times from communication with the regular and normal self of the individual but still they form conscious unities have continuous memories speak write invent distinct names for them selves or adopt names that are suggested and in short are entirely worthy of that title of secondary personalities which is now commonly given them Ac cording to M Janet these secondary personalities are always abnormal and result from the splitting of what ought to be a single complete self into two parts of which one lurks in the background whilst the other appears on the sur face as the only self the man or woman has For our present purpose it is unim portant whether this account of the origin of secondary selves is applicable to all possible cases of them or not for it certainly is true of a large number of them Now although the *size* of a secondary self thus formed will depend on the number of thoughts that are thus split off from the main consciousness the *form* of it tends to personality and the later thoughts pertaining to it remember the earlier ones and adopt them as their own M Janet caught the actual mo ment of inspissation (so to speak) of one of these secondary personalities in his anæsthetic somnambulist Lucie He found that when this young woman s at tention was absorbed in conversation with a third party her anæsthetic hand would write simple answers to questions whispered to her by himself Do you hear? he asked *No* was the unconsciously written reply But to answer you must hear *Yes quite so* Then how do you manage? *I don t know* There must be some one who hears me *Yes* Who? *Someone other than Lucie* Ah! another person Shall we give her a name? *No* Yes it will be more convenient *Well Adrienne then* Once baptized the sub con scious personage M Janet continues grows more definitely outlined and displays better her psychological characters In particular she shows us that she is conscious of the feelings excluded from the consciousness of the primary or normal personage She it is who tells us that I am pinching the arm or touching the little finger in which Lucie for so long has had no tactile sensations [1]

In other cases the adoption of the name by the secondary self is more spon taneous I have seen a number of incipient automatic writers and mediums as yet imperfectly developed who immediately and of their own accord write and speak in the name of departed spirits These may be public characters as Mozart Faraday or real persons formerly known to the subject or altogether imaginary beings Without prejudicing the question of real spirit control in the more developed sorts of trance utterance I incline to think that these (often deplorably unintelligent) rudimentary utterances are the work of an inferior fraction of the subject s own natural mind set free from control by the rest and working after a set pattern fixed by the prejudices of the social environ ment In a spiritualistic community we get optimistic messages whilst in an ignorant Catholic village the secondary personage calls itself by the name of a demon and proffers blasphemies and obscenities instead of telling us how

[1] *L Automatisme psychologique* p 318

is dark a somewhat less dark sensation makes us see an object white Helmholtz calculates that the white marble painted in a picture representing an archi tectural view by moonlight is when seen by daylight from ten to twenty thou sand times brighter than the real moonlit marble would be[1]

Such a difference as this could never have been *sensibly* learned it had to be inferred from a series of indirect considerations There are facts which make us believe that our sensibility is altering all the time so that the same object cannot easily give us the same sensation over again The eye s sensibility to light is at its maximum when the eye is first exposed and blunts itself with surprising rapidity A long night s sleep will make it see things twice as brightly on wakening as simple rest by closure will make it see them later in the day We feel things differently according as we are sleepy or awake hungry or full fresh or tired differently at night and in the morning differently in summer and in winter and above all things differently in childhood manhood and old age Yet we never doubt that our feelings reveal the same world with the same sensible qualities and the same sensible things occupying it The difference of the sensibility is shown best by the difference of our emotion about the things from one age to another or when we are in different organic moods What was bright and exciting becomes weary flat and unprofitable The bird s song is tedious the breeze is mournful the sky is sad

To these indirect presumptions that our sensations following the mutations of our capacity for feeling are always undergoing an essential change must be added another presumption based on what must happen in the brain. Every sensation corresponds to some cerebral action For an identical sensation to recur it would have to occur the second time *in an unmodified brain* But as this strictly speaking is a physiological impossibility so is an unmodified feeling an impossibility for to every brain modification however small must correspond a change of equal amount in the feeling which the brain subserves

All this would be true if even sensations came to us pure and single and not combined into things. F en th [illegible] ave to confess that however [illegible] ng the same sensation again [illegible] and that whatever was true [illegible] ng it would certainly be true [illegible] Heraclitus that we never descend twice into the same stream

But if the assumption of simple ideas of sensation recurring in immutable shape is so easily shown to be baseless how much more baseless is the assumption of immutability in the larger masses of our thought!

For the e it is obvious and [illegible] [illegible] ver precisely [illegible] ing unique

[illegible] n we cognize it is the thought [illegible] ations a thought suffused with the consciousness of all that dim cont xt Often we are ourselves struck at the strange differences in our successive views of the same thing We wonder how we ever could have opined

[1] Popular Wiss ns haftlich [illegible] L 3 p. 7 (8 6)
Fick, in L. Hermann Handb d Physiol v L III pt. 1 p. 5

Such a description as this can awaken no possible protest from any one We all recognize as different great classes of our conscious states Now we are seeing now hearing now reasoning now willing now recollecting now expecting *now loving now hating and in a hundred other ways we know our minds* to be alternately engaged But all these are complex states The aim of science is always to reduce complexity to simplicity and in psychological science we have the celebrated theory of *ideas* which admitting the great difference among each other of what may be called concrete conditions of mind seeks to show how this is all the resultant effect of variations in the *combination* of certain simple elements of consciousness that always remain the same These mental atoms or molecules are what Locke called simple ideas Some of Locke s successors made out that the only simple ideas were the sensations strictly so called Which ideas the simple ones may be does not however now concern us It is enough that certain philosophers have thought they could see under the dissolving view appearance of the mind elementary facts of *any* sort that remained unchanged amid the flow

And the view of these philosophers has been called little into question for our common experience seems at first sight to corroborate it entirely Are not the sensations we get from the same object for example always the same? Does not the same piano-key struck with the same force make us hear in the same way? Does not the same grass give us the same feeling of green the same sky the same feeling of blue and do we not get the same olfactory sensation no matter how many times we put our nose to the same flask of cologne? It seems a piece of metaphysical sophistry to suggest that we do not and yet a close attention to the matter shows that *there is no proof that the same bodily sensation is ever got by us twice*

What is got twice is the same OBJECT We hear the same *note* over and over again we see the same *quality* of green or smell the same objective perfume or experience the same *species* of pain The realities concrete and abstract physical and ideal whose permanent existence we believe in seem to be constantly *coming up again before our thought and lead us in our carelessness to* suppose that our ideas of them are the same ideas When we come some time later to the chapter on Perception we shall see how inveterate is our habit of not attending to sensations as subjective facts but of simply using them as stepping stones to pass over to the recognition of the realities whose presence they reveal The grass out of the window now looks to me of the same green in the sun as in the shade and yet a painter would have to paint one part of it dark brown another part bright yellow to give its real sensational effect We take no heed as a rule of the different way in which the same things look and sound and smell at different distances and under different circumstances The sameness of the *things* is what we are concerned to ascertain and any sensations that assure us of that will probably be considered in a rough way to be the same with each other This is what makes off hand testimony about the subjective identity of different sensations well nigh worthless as a proof of the fact The entire history of Sensation is a commentary on our inability to tell whether two *sensations received apart are exactly alike* What appeals to our attention far more than the absolute quality or quantity of a given sensation is its *ratio* to whatever other sensations we may have at the same time When everything

be i
us [illegible] er again The eye's sens[illegible]

on wakening as simple rest by closure will make it see them [illegible]
We feel things differently according as we are sleepy or awake hungry or full fresh or tired differently at night and in the morning differently in summer and in winter and above all things d fferently in childhood manhood and old age Yet we never doubt that our feelings reveal the same world with the same sensible qualities a d the same sensible things occupying it The difference of the sens bil ty is shown best by the difference of our emotion about the things from one age to another or when we are in different organic moods What was br ght and exciting becomes weary flat and unprofitable The bird s song is tedious the breeze is mournful the sky is sad.

To these ind rect presumptions that our sensations following the mutations of our capacity for feeling are always undergoin an essential change must *be added another presumption based on what must happen in the brain* Every sensat on corresponds to some cerebral action. For an identical sensation to recur t would have to occur the second time *in an unmod fied brain* But as this strictly speaking is a physiological imposs bility so is an unmodified feeling an imposs bility for to every brain modificat on however small must correspond a change of equal amount in the feeling which the brain subserves

All this would be true if even sensations came to us pure and single and not combined into things Even then we should have to confess that however we might in ordinary conversation speak of getting the same sensation again we never in strict theoretic accuracy could do so and that whatever was true of the river of life of the river of elementary feel ng it would certainly be true to say like Heraclitus that we never descend tw ce into the same stream

But if the assumption of s mple ideas of sensation recurring in immutable shape is so eas ly shown to be baseless how much more baseless is the assumption of immutability in the larger masses of our thought!

For there it is obvious and palpable that our state of mind is never precisely the same Every thought we have of a given fact is strictly speaking un que and only bears a resemblance of kind with our other thoughts of the same fact When the ident cal fact recurs we *must* th nk of it in a fresh manner see it

P pula Wis ens k ftliche Vort g I 3 p 7 (876)
F ch, in L. H rmann *H ndb d Phy l* L iii pt p 5

as we did last month about a certain matter We have outgrown the possibility of that state of mind we know not how From one year to another we see things in new lights What was unreal has grown real and what was exciting is insipid The friends we used to care the world for are shrunken to shadows the women once so divine the stars the woods and the waters how now so dull and common! the young girls that brought an aura of infinity at present hardly distinguishable existences the pictures so empty and as for the books what was there to find so mysteriously significant in Goethe or in John Mill so full of weight? Instead of all this more zestful than ever is the work the work and fuller and deeper the import of common duties and of common goods

But what here strikes us so forcibly on the flagrant scale exists on every scale down to the imperceptible transition from one hour s outlook to that of the next Experience is remoulding us every moment and our mental reaction on every given thing is really a resultant of our experience of the whole world up to that date The analogies of brain physiology must again be appealed to to corroborate our view

Our earlier chapters have taught us to believe that whilst we think our brain changes and that like the aurora borealis its whole inte[illegible]
shifts with every pulse of change
moment is a product of many fact[illegible]
blood supply may be among them but just as one of them certainly is the influence of outward objects on the [illegible] ring the moment so is an [illegible] ich the organ has been left [illegible] Every brain state is partly [illegible] ssion Alter the latter in any part and the brain state must be somewhat different Each present brain state is a record in which the eye of Omniscience might read all the foregone history of its owner It is out of the question then that any total brain state should identically recur Something like it may recur but to suppose *it* to recur would be equivalent to the absurd admission that all the states that had intervened between its two appearances had been pure nonentities and that the organ after their passage was exactly as it was before And (to consider shorter periods) just as in the senses an impression feels very differently according to what has preceded it as one color succeeding another is modified by the contrast silence sounds delicious after noise and a note when the scale is sung up sounds unlike itself when the scale is sung down as the presence of certain lines in a figure changes the apparent form of the other lines and as in music the whole æsthetic effect comes from th[illegible] ters
the
[illegible] is
[illegible] consciousness a codeterminant of how and what we now shall feel [1]

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the

[illegible] otal combinati n as this is the analogu
[illegible] consciousness at any m ment is due.

Ever some tracts are waning in tension some waxing whilst others actively discharge The states of tension have as positive an influence as any in determinin the total condition and in decidin what the *psychosis* shall be All we know of submaximal nerve-irritations and of the summation of apparently ineffective stimuli tends to show that *no* chan es in the brain are physiologically ineffective and that presumably none are bare of psycholo ical result But as the brain tension shifts from one relative state of equilibrium to another like the gyrations of a kaleidoscope now rapid and now slow is it likely that its faithful psychic concomitant is heavier footed than itself and that it cannot match each one of the organ s irradiations by a shifting inward iridescence of its own? But if it can do this its inward iridescences must be infinite for the brain redistributions are in infinite variety If so coarse a thing as a telephone-plate can be made to thrill for years and never reduplicate its inward condition how much more must this be the case with the infinitely delicate brain?

I am sure that this concrete and total manner of regarding the mind s changes is the only true manner difficult as it may be to carry it out in detail If any thin seems obscure about t it will grow clearer as we advance Meanwhile if it be true it is certainly also true that no two ideas are ever exactly the same wh ch is the propos tion we started to prove The propo ition is more important theoretically than it at first si ht seems For it makes it already impossible for us to follow obediently in the footprints of either the Lockian or the Herbartian chool schools which have had almost unlimited influence in Germany and among our elves No doubt it s often *comen ei t* to formulate the mental facts in an atomistic sort of way and to treat the h her states of consciousness as if they were all built out of unchan n simple ideas It is convenient often to treat curves as f they were composed of small straight lines and electricity and nerve-fo ce as if they were fluids But in the one ca e as in the other we mu t never fo get that we are talkin symbol ... that there is nothing ... *g idea or Vorstel* ... *s of consc ousness at* ... *ack of Spades* ... mulas is the whole or gan zation of speech which as was ... ... nt is most easily conceived under the law of the thin whose name it bears! If the thing is compo ed of parts then we suppo e that the thou ht of the th n ... ie thoughts of ... ng or in other ... now the very ... part wh ch was there on those occasions If the thing is simple its thou ht is simple If t is multitudinous it must require a multitude of thou hts to think it If a succession only a succession of thoughts can know it If permanent its thou ht is permanent And so on *ad libitu n* What after all is so natural as to assume that one object called by one name should be known by one affection of the mind? But if langua e must thus influence us the agglutinati e languages and even Greek and Lat n with the r declens ons would be the better guides Names did not appear in them inalterable but

changed their shape to suit the context in which they lay It must have been easier then than now to conceive of the same object as being thought of at different times in non identical conscious states

This too will grow clearer as we proceed Meanwhile a necessary consequence of the belief in permanent self identical psychic facts that absent themselves and recur periodically is the Humian doctrine that our thought is composed *of separate independent parts and is not a sensibly continuous stream* That this doctrine entirely misrepresents the natural appearances is what I next shall try to show

3 *Within each personal consciousness thought is sensibly continuous*

I can only define continuous as that which is without breach crack or division I have already said that the breach from one mind to another is perhaps the greatest breach in nature The only breaches that can well be conceived to occur within the limits of a single mind would either be *interruptions time* gaps during which the consciousness went out altogether to come into ex*istence again at a later moment or they would be breaks in the quality or con*tent of the thought so abrupt that the segment that followed had no connection whatever with the one that went before The proposition that within each personal consciousness thought feels continuous means two things

1 That even where there is a time-gap the consciousness after it feels as if it belonged together with the consciousness before it as another part of the same self,

2 That the changes from one moment to another in the quality of the consciousness are never absolutely abrupt

The case of the time gaps as the simplest shall be taken first And first of all a word about time gaps of which the consciousness may not be itself aware

On page 130 we saw that such time gaps existed and that they might be more numerous than is usually supposed If the consciousness is not aware of them it cannot feel them as interruptions In the unconsciousness produced by nitrous oxide and other anæsthetics in that of epilepsy and fainting the broken edges of the sentient life may meet and merge over the gap much as the feelings of space of the opposite margins of the blind spot meet and merge over that objective interruption to the sensitiveness of the eye Such consciousness as this whatever it be for the onlooking psychologist is for itself unbroken It *feels* unbroken a waking day of it is sensibly a unit as long as that day lasts in the sense in which the hours themselves are units as having all their parts next each other with no intrusive alien substance between To expect the consciousness to feel the interruptions of its objective continuity as gaps would be like expecting the eye to feel a gap of silence because it does not hear or the ear to feel a gap of darkness because *it does not see So much for the gaps that are* unfelt

With the felt gaps the case is different On waking from sleep we usually know that we have been unconscious and we often have an accurate judgment of how long The judgment here is certainly an inference from sensible signs and its ease is due to long practice in the particular field [1] The result of it how

[1] The accurate registration of the how long is still a little mysterious.

what it was in the former case

ever is that

but interrup

other sense

belonging together because they are parts of a

remains sensibly continuous and one. What now is the common whole? The natural name for it is *myself I* or *me*.

When Paul and Peter wake up in the same bed and recognize that they have been asleep each one of them mentally reaches back and makes connection with but *one* of the two streams of thought which were broken by the sleeping hours. As the current of an electrode buried in the ground unerringly finds its way *to its own* similarly buried mate across no matter how much intervening earth so Peter's present instantly finds out Peter's past and never by mistake knits itself on to that of Paul Paul's thought in turn is as little liable to go astray The past thought of Peter is appropriated by *the present Peter alone* He may have a *knowledge* and a correct one too of what Paul's last drowsy states of mind were as he sank into sleep but it is an entirely different sort of knowledge from that which he has of his own last states He *remembers* his own states whilst he only *conceives* Paul's Remembrance is like direct feeling its object is suffused with a warmth and intimacy to which no object of mere conception ever attains This quality of warmth and intimacy and immediacy is what Peter's *present* thought also possesses for itself So sure as this present is me is mine it says so sure is anything else that comes with the same warmth and intimacy and immediacy me and mine What the qualities called warmth and intimacy may in themselves be will have to be matter for future consideration But whatever past feelings appear with those qualities must be admitted to receive the greeting of the present mental state to be owned by it and accepted as belonging together with it in a common self This community of self is what the time-gap cannot break in twain and is why a present thought although not ignorant of the time-gap can still regard itself as continuous with certain chosen portions of the past

does not appear to itself chopped up in bits Such words

the stream of thought of consciousness or of subjective life

But now there appears even within the limits of the same self and between thoughts all of which alike have this same sense of belonging together a kind of jointing and separateness among the parts of which this statement seems to take no account I refer to the breaks that are produced by sudden *contrasts in the quality* of the successive segments of the stream of thought. If the words

object or change in a sensation create a real interruption sensibly felt as such which cuts the conscious stream across at the moment at which it appears? Do not such interruptions smite us every hour of our lives and have we the right, in their presence still to call our consciousness a continuous stream?

This objection is based partly on a confusion and partly on a superficial introspective view.

The confusion is between the thoughts themselves, taken as subjective facts, and the things of which they are aware. It is natural to make this confusion, but easy to avoid it when once put on one's guard. The things are discrete and discontinuous; they do pass before us in a train or chain, making often explosive appearances and rending each other in twain. But their comings and goings and contrasts no more break the flow of the thought that thinks them than they break the time and the space in which they lie. A silence may be broken by a thunder-clap, and we may be so stunned and confused for a moment by the shock as to give no instant account to ourselves of what has happened. But that very confusion is a mental state, and a state that passes us straight over from the silence to the sound. The transition between the thought of one object and the thought of another is no more a break in the *thought* than a joint in a bamboo is a break in the wood. It is a part of the *consciousness* as much as the joint is a part of the *bamboo*.

The superficial introspective view is the overlooking, even when the things are contrasted with each other most violently, of the large amount of affinity that may still remain between the thoughts by whose means they are cognized. Into the awareness of the thunder itself the awareness of the previous silence creeps and continues; for what we hear when the thunder crashes is not thunder *pure*, but thunder-breaking-upon-silence-and-contrasting-with-it.[1] Our feeling of the same objective thunder, coming in this way, is quite different from what it would be were the thunder a continuation of previous thunder. The thunder itself we believe to abolish and exclude the silence; but the *feeling* of the thunder is also a feeling of the silence as just gone; and it would be difficult to find in the actual concrete consciousness of man a feeling so limited to the present as not to have an inkling of anything that went before. Here, again, language works against our perception of the truth. We name our thoughts simply, each after its thing, as if each knew its own thing and nothing else. What each really knows is clearly the thing it is named for, with dimly perhaps a thousand other things. It ought to be named after all of them, but it never is. Some of them are always things known a moment ago more clearly; others are things to be known more clearly a moment hence.[2] Our own bodily position, attitude, con-

[1] *Cf.* Brentano, *Psychologie*, vol. I, pp. 219–20. Altogether this chapter of Brentano's on the unity of consciousness is as good as anything with which I am acquainted.

[2] Honor to whom honor is due! The most explicit acknowledgment I have anywhere found of all this is in a buried and forgotten paper by the Rev. James Wills, on 'Accidental Association,' in the *Transactions of the Royal Irish Academy*, vol. XXI, part I (1846). Mr. Wills writes:

"At every instant of conscious thought there is a certain sum of perceptions or reflections ... Of this ... c nse ... s limit ... the most dim shade of perception enters ... and in some infinitesimal degree modifies the whole existing state. This state will thus be in some way modified by any sensation or emotion, or act of distinct attention, that may give prominence to any part of it; so that the actual result is capable of the utmost variation, according to the person or the occasion. ... To any portion of the entire scope here described there may be a special direction of the attention, and this special direction is recognized as strictly what is *recognized* as the idea

dition is one of the things of which *some* awareness however inattentive invariably accompanies the knowledge of whatever else we know We think and as we think we feel our bodily selves as the seat of the thinking If the thinking be *our* thinking it must be suffused through all its parts with that peculiar warmth and intimacy that make it come as ours. Whether the warmth and intimacy be anything more than the feeling of the same old body always there is a matter for the next chapter to decide Whatever the content of the ego may be it is habitually felt *with* everything else by us humans and must form a *liaison* between all the things of which we become successively aware[1]

On this gradualness in the changes of our mental content the principles of nerve-action can throw some more light When studying in Chapter III the summation of nervous activities we saw that no state of the brain can be supposed i [illegible] mes the inertia of the old state will sti [illegible]
in our i [illegible]
monest [illegible]
trast [illegible]
particular orders in a series of impressions gi [illegible]
[illegible] ... nably that consciousness of the *whence* and

is not produced simply by *c*'s excitement [illegible]
a and *b* as well. If we want to represent the brain process we must write it thus $_{a}{}^{b}c$—three different processes coexisting and correlated with them a thou ht which is no one of the three thoughts which they would have produ ed had each of them occurred alone But whatever this fourth thought may exactly be t seems impossible that it should not be something *like* each of the three other thoughts whose tracts are concerned in its production though in a fast waning phase

It all goes back to what we said in another connection only a few pages a o (p 151) As th total neurosis changes so does the total psychosis change But as the changes of neurosis are never absolutely discontinuous so must the successi e psychoses shade gradually into each other although their *rate* of chan e may be much faster at one m ment than at the next

This difference in the rate of change lies at the basis of a difference of subjecti e states of wh ch we ought immediately to peak. When the rate is slow we are aware of the object of our thought in a comparati ely restful and stable

p sent t th mind. Th dea is dently t mmens rat with th tur t t f pp e- h d m h pe pl t h rise f m t bserving this f ct H w deeply w

f the lights. Our m tal tates have alw y *es ntial ity* ch th t ch tat f ppre hensi h er an usly compounded is singl h l f which every mpo ent is, th ref trictly pprehended (so far as t is pprehended) part S ch is th el mentary basis f m which ll int llect al per ti ns mmence

[1] Compare the charming passag in Taine *Int llig nce* (N Y ed.) I, pp. 83–84.

way When rapid we are aware of a passage a relation, a transition *from* it or *between* it and something else As we take in fact a general view of the wonder ful stream of our consciousness what strikes us first is this different pace of its parts Like a bird s life it seems to be made of an alternation of flights and perchings The rhythm of language expresses this, where every thought is ex pressed in a sentence and every sentence closed by a period The resting places are usually occupied by sensorial imaginations of some sort whose peculiarity is that they can be held before the mind for an indefinite time, and contem plated without changing the places of flight are filled with thoughts of rela tions static or dynamic that for the most part obtain between the matters contemplated in the periods of comparative rest

Let us call the resting places the substantive parts and the places of flight the transitive parts of the stream of thought It then appears that the main end of our thinking is at all times the attainment of some other substantive part than the one from which we have just been dislodged And we may say that the main use of the transitive parts is to lead us from one substantive conclusion to another

Now it is very difficult introspectively to see the transitive parts for what they real
at them
we wait t
that it quite eclipses and swallows them up in its glare Let anyone try to cut a thought across in the middle and get a look at its section and he will see how difficult the introspective observation of the transitive tracts is The rush of the thought is so headlong that it almost always brings us up at the conclusion be fore we can arrest it Or if our purpose is nimble enough and we do arrest it it ceases forthwith to be itself As a snow flake crystal caught in the warm hand *is no longer a crystal but a drop so instead of catching the feeling of relation* moving to its term we find we have caught some substantive thing usually the last word we were pronouncing statically taken and with its function tend ency and particular meaning in the sentence quite evaporated The attempt at introspective analysis in these cases is in fact like seizing a spinning top to catch its motion or trying to turn up the gas quickly enough to see how the *darkness looks And the challenge to produce* these psychoses which is sure to be thrown by doubting psychologists at anyone who contends for their exist ence is as unfair as Zeno s treatment of the advocates of motion when asking them to point out in what place an arrow *is* when it moves he argues the falsity of their thesis from their inability to make to so preposterous a question an im mediate reply

The results of this introspective difficulty are baleful If to hold fast and observe the transitive parts of thought s stream be so hard then the great blun der to which all schools are liable must be the failure to register them and the undue emphasizing of the more substantive parts of the stream Were we not ourselves a moment since in danger of ignoring any feeling transitive between the silence and the thunder and of treating their boundary as a sort of break in the mind? Now such ignoring as this has historically worked in two ways One set of thinkers have been led by it to *Sensationalism Unable to lay their* hands on any coarse feelings corresponding to the innumerable relations and

forms of connection between the facts of the world finding no *named* subjective modifications mirroring such relations they have for the most part denied that feelings of relation exist and many of them like Hume have gone so far as to deny the reality of ... d as well as in it. Substan
ti ... h es sensatio
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distinct substantive feelings in which they ... h drawn an opposite conclu
miss on that the feeli
s on The relations m
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these relations by something that l
purus of Thought Intellect or Re...
to mean something unutterably superior to any fact of sensibility whatever
... h I t llectualists and Sensationalists are

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We ought to say a feeling of *and* a feeling of *if* a feeling ... of *by* quite as readily as we say a feeling of *blue* or a feeling of *cold* Yet we do not so in eterate has our habit become of recognizing the existence of the substanti e parts alone that language almost refuses to lend itself to any other use Th Em ... ha e always dwelt on its influence in making us suppose that
v

name no ent ty can exist All *dumb* or anonymous psychic states have owing to this erro
te the su
h it tl

E.g Th tr am f th ght is t tin us curr t, b t en f distin t deas, m re less pad in their cessi th pidity being m as rabl by the umbe th t pass th h th mind in gi tum (Bain *Th Em t nd th Will* p 9)

part The pulses of change are doubtless more violent in one place than in another their rhythm more rapid at this time than at that As in a kaleidoscope revolving at a uniform rate, although the figures are always rearranging themselves there are instants during which the transformation seems minute and interstitial and almost absent followed by others when it shoots with magical rapidity relatively stable forms thus alternating with forms we should not distinguish if seen again so in the brain the perpetual rearrangement must result in some forms of tension lingering relatively long whilst others simply come and pass *But if consciousness corresponds to the fact of rearrangement itself* why if the rearrangement stop not should the consciousness ever cease? And if a lingering rearrangement brings with it one kind of consciousness why should not a swift rearrangement bring another kind of consciousness as peculiar as the rearrangement itself? The lingering consciousnesses if of simple objects we call sensations or images according as they are vivid or faint if of complex objects we call them percepts when vivid concepts or thoughts when faint For the swift consciousnesses we have only those names of transitive states or feelings of relation which we have used [1] As the brain changes are continu

(*Leçons de philosopl e* pt II 3d lesson)

Th re is no one v hose intelligence does not embrace imultaneou ly many id as more or less d stinct more or less confused No v v hen we have many ideas at once a peculiar feel ng n us e feel mong the e idea resemblances differences relations Let us call this

relat on They a e the effect f our mparing them and rea oning bout th m

S milarly Cardaill c (*Étt des elé ta res de philosopl e* sec I chap VII)

By a nat r l c se nce e are led t supp se that at the same time that v e ha e several s n sens tio s tions exists ings ist the m st varied b cause relatı ns b g m r numer us than b ings the feel ngs of rel tion must be in the same proportio m re m ro s than the s nsations wh pres ence gives rise to th ir f rmat on ad the m t fert le for the rel tive ideas f which the feel ng of relation is th sourc are more important th n absolute ideas, if such exi t mmon p ech w fin l the feelin f r lation e pressed th re in a th u

but the feeling of th se relati ns am g the parts wh ch const tutes the r ment? D d we n t feel relations we should n r attain t true knowl dge for lmost all our kn wl dge is of relations. We never have an isolated sensation we a e theref re never without

ous, so do all these consciousnesses melt into each other like dissolving views. Properly they are but one protracted consciousness one unbroken stream

Feelings of Tendency

So much for the transitive states But there are other unnamed states or qual ities of states that are [illegible] ... and just as much unrecognized by [illegible] phies of mind The firs [illegible]

th feeling f relati n relati ns so ear th so intimately fused in the sensati tself relati that th silence f m taphysicians as t ... [illegible] persisted in asking f m sensati n al th se deas

t is [illegible] expressing [illegible] tain m feeli tion

f the mind by which intervention f any as there is an riginal tendency suscе and ha prod ced certain affection f th primary elementary feelings f perce percepti ns are f ar us pecies, so are relations, indeed en f external things, tions is, necessarily limited by that of the bjects which ha ... affecti f ur ... t th t susceptibility f the mind by which it has th feelin ur body w ul Mr pence that t is nly relati ns, relat well as in tran so clear that

"Th proximat mponents mind are ... th relati ns between feelings. Am g th members f each gr p ther exist multit dinous unlikenesses, many of which ar extrem ly str ng b t ch unlikenesses are mall compared with those which distinguish m mbers f th gr p from members f th ther Let us, in the first place, onsider what are th characters which all Feelings ha in comm and what are th charact rs which all Relati ns between feelings ha in mmon.

Each feeling, as w here defin it, is any porti f consci usness which occupies place sufficiently large to gi t perceivable indi iduality which has ts indi duality marked off fr m adjacent portions f nsciousness by qualitati co trasts and which when intro-specti ely co t mplated ppears t be homogeneous. These ar th essentials. Ob iously if under introspection, state f onsciousness is decomposable into unlike parts that exist

junction but denies that anything in the way of *feeling* has a share in bringing it about Examples will make clear what these inarticulate psychoses due to waxing and waning excitements of the brain are like[1]

Suppose three successive persons say to us Wait! Hark!" Look! Our consciousness is thrown into three quite different attitudes of expectancy al though no definite object is before it in any one of the three cases Leaving out different actual bodily attitudes and leaving out the reverberating images of the three words which are of course diverse probably no one will deny the exist

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either simultaneously or successively it is not one feeling but two or more Obviously if it

having no independent place no individuality of its own It is true that under an ultimate analysis what we call a relation proves to be itself a kind of feeling—the momentary feeling

by the unlikenesses of the feelings which accompany the momentary transitions Each rela tional feeling may in fact be regarded as one of those nervous shocks which we suspect to be the units of composition of feelings and though instantaneous it is known as of greater or less strength and as taking place with greater or less facility But the contrast between these relational feelings and what we o dinarily call feelings is so strong that we must class them apart The r extreme brevity their small variety and their dependence on the terms they unite differentiate them in an unmistakable way

Perhaps it will be well to recognize more fully the truth that this distinction cannot be absolute Besides admitting that as an element of consciousness a relation is a momentary feeling we must also admit that just as a relation can have no existence apart from the feel ings which form its terms so a feeling can exist only by relations to other feelings which lim t it in space or time or both Strictly spe king neither a feeling nor a relation is an independent element of consciousness there is throughout a dependence such that the appre ciable areas of consciousness occup ed by feelings can no more possess indiv dualities apart from the relations which link them than these relations can possess individual ties apart from the feelings they link The essential distinction between the two then appears to be that whereas a relation l feeling is a portion of consciousness inseparable into parts a feel ng ord narily so called is a portion of consciousness that admits imaginary division into like parts which are related to one another in sequence or coexiste ce A feeling proper is either

occup ed by a certain subject we nevertheless a e engag d w th and ha e our attention almost c mpletely absorb d by matt rs quite disconnected th ewithal We do not th n exactly think of the object of our preoccupati n we d not represent it in a clear manner and yet our mind is not s it would be w thout this preo c pation Its object absent f m consciousness is nevertheless represented th e by a peculiar unmistakable impressio which often persists long and is a stro g f l ng although so obscure f r o r int ll g ce A men tal sign of the kind is the unfavorable di position left in our mind towards n individ al by painful incidents erewhile experienc d a d n w perhaps f rgotten The sign remains but is not und rstood its definite meanin is lost (p 458)

ence of a residual conscious affection a sense of the direction from which an im pression is about to come althou h no positive impression is yet there Mean while we have no names for the psychoses in question but the names hark look and wait.

Suppose we try to recall a forgotten name The state of our consciousness is peculiar There is a gap therein but no mere gap It is a gap that is intensely ac tive A sort of wraith of the name is in it beckoning us in a given direction mak in us at moments tin le with the sense of our closeness and then letting us sink back without the longed for term If wrong names are proposed to us this singu larly definite gap acts immediately so as to negate them They do not fit into its mould And the g the gap of another all empty of content as bot vainly try to rec what it is when persons will say which might make them different are not there? All that is effort to recall is vain is the bare effort itself How should that differ in the two cases? prematurely filling it out with the dif ferent two e you'll be quite unable to designate any point in which truly enough We can only designate the difference by borrowing the names of objects not yet in the mind Which is to say that our psychological vocabulary is wholly inadequate to name the differences that exist even such strong differ ences as these But namelessness is compatible with existence There are innu merable consciousnesses of emptiness no one of which taken in itself has a name but all diffe ent from each other The ordinary way is to assume that they are all emptinesses of consciousness and so the same state But the feeling of an a the h ence of a feeling It is an intense feeling

fect of the blank rhythm of some forgotten verse restlessly dancing in ou filled t with words

sometimes carry this inarticulate feeling of their familiarity so deep into our consci usness that we are fairly shaken by its mysterious emotional power But stro and characteristic as this psychosis is—it probably is due to the submax imal excitement of wide-spreading associational brain tracts—the only name we ha e for all its shadings is sense of familiarity

When we read such phrases as nau ht but either one or the other *a* is *b* but althou h t is nevertheless it is an excluded middle there is no *ter*

read? What makes that meaning different in one phrase from what it is in the

other? Who? When? Where? ' Is the difference of felt meaning in these interrogatives nothing more than their difference of sound? And is it not (just like the difference of sound itself) known and understood in an affection of con sciousness correlative to it though so impalpable to direct examination? Is not

I

tive sense though no definite sensorial image plays any part in it whatsoever Sensorial images are stable psychic facts we can hold them still and look at them as long as we like These bare images of logical movement on the contrary are psychic transitions always on the wing so to speak and not to be glimpsed except in flight Their function is to lead from one set of images to another As they pass we feel both the waxing and the waning images in a way altogether peculiar and a way quite different from the way of their full presence If we try to hold fast the feeling of direction the full presence comes and the feeling of direction is lost The blank verbal scheme of the logical movement gives us the fleeting sense of the movement as we read it quite as well as does a rational sentence awakening definite imaginations by its words

What is that first instantaneous glimpse of some one s meaning which we have when in vulgar phrase we say we twig it? Surely an altogether specific affection of our mind And has the reader never asked himself what kind of a mental fact is his *intention of saying a thing* before he has said it? It is an en tirely definite intention distinct from all other intentions an absolutely distinct state of consciousness therefore and yet how much of it consists of definite sensorial images either of words or of things? Hardly anything! Linger and the words and things come into the mind the anticipatory intention the divination is there no more But as the words that replace it arrive it welcomes them suc cessively and calls them right if they agree with it it rejects them and calls them wrong if they do not It has therefore a nature of its own of the most positive sort and yet what can we say about it without using words that belong to the later mental facts that replace it? The intention *to say so and so* is the only name it can receive One may admit that a good third of our psychic life consists in these rapid premonitory perspective views of schemes of thought not yet ar ticulate How comes it about that a man reading something aloud for the first time is able immediately to emphasize all his words aright unless from the very first he have a sense of at least the form of the sentence yet to come which sense is fused with his consciousness of the present word and modifies its emphasis in his mind so as to make him give it the proper accent as he utters it? Emphasis of this kind is almost altogether a matter of grammatical construction If we read no more we expect presently to come upon a than if we read however at the outset of a sentence it is a yet still or a nevertheless that we expect A noun in a certain position demands a verb in a certain mood and number in another position it expects a relative pronoun Adjectives call for nouns verbs for adverbs etc etc And this foreboding of the coming grammatical scheme combined with each successive uttered word is so practically accurate that a reader incapable of understanding four ideas of the book he is reading aloud can nevertheless read it with the most delicately modulated expression of intelli gence

Some will interpret these facts by calling them all cases in which certain images by laws of association awaken others so very rapidly that we think afterwards we felt the very *tendencies* of the nascent images to arise before they were actually there For this school the only possible materials of consciousness are images of a perfectly definite nature Tendencies exist but they are facts for the outside p ycholo᷉st rather than for the subject of the observation. The tendency is thus a *psych cal* zero only its *results* are felt.

Now what I contend for and accumulate examples to show is that tendencies are not only descriptions from without but that they are among the *objects* of the stream which is thus aware of them from within and must be described as in very large measure constituted of *feelings* of *tendency* often so vague that we are unable to name them at all It is in short the re-instatement of the vague to its proper place in our mental life which I am o anxious to press on the attention Mr Galton and Prof Huxley have as we shall see in Chapter XVIII made one step in ad ance in explodin the ridiculous theory of Hume and Berkeley that we can have no ima es but of perfectly definite things. Another is made in the overthrow of the equally ridiculous notion that whilst simple objec ti e qualities are revealed to our knowled e in subjective feelings relations are not But these reforms are not half sweeping and radical enou h What must be admitted is th t the definite images of traditional psychology form but the very smallest part of our minds as they actually live The traditional psychology talks like one who should say a r er consists of nothing but pailfuls poonfuls quart potfuls barrelfuls and other moulded forms of water Even were the pails and the pots all actually standing in the stream still between them the free water ... o fl w It s just this free water of consciousness that psycholo-

...

or penumbra that surrounds and escorts it —or rather that is fused into one with t and has become bone of its bone and flesh of its flesh leaving it it is tru an image of the same *th g* it was before but making it an image of that

...

have ast p emonitory glimpses of schemes of relation between terms which hardly e en as e bal mages enter the mind so rapid is the whole process We all of us ha e this permanent consciousness of whither our thou ht s going It is a feeling like any other a feeling of what thoughts are next to ari e befo e they ha e arisen This field of v ew of consciousness varies very much in extent de-

M zart describes th his mann f composing first b ts d crumb f th piece com and gradually j in t g th in his mind th th soul g tting warmed t th w k, th thing gr w m re and m re and I pread t t b oad and cleare and t last t g is almost finished in my head even hen t is l g piece so th t I can see th wh l f t t singl glan in my mind as if t er be tiful paintin handsom human being in which y I d not h ar t in my im ginati t all as ccessi n—th w y t must com later— b all t nce, as t w It is rare feast! All th in enting and making g es n m m as in beautiful strong dream. B t the best f all is th *hearing f it all at nce*

pending largely on the degree of mental freshness or fatigue When very fresh, our minds carry an immense horizon with them The present image shoots its perspective far before it irradiating in advance the regions in which lie the thoughts as yet unborn Under ordinary conditions the halo of felt relations is much more circumscribed And in states of extreme brain fag the horizon is nar rowed almost to the passing word —the associative machinery, however providing for the next word turning up in orderly sequence until at last the tired thinker is led to some kind of a conclusion At certain moments he may find himself doubting whether his thoughts have not come to a full stop but the vague sense of a *plus ultra* makes him ever struggle on towards a more definite expression of what it may be whilst the slowness of his utterance shows how difficult under such conditions the labor of thinking must be

The awareness that our *definite* thought has come to a stop is an entirely dif ferent thing from the awareness that our thought is definitively completed The expression of the latter state of mind is the falling inflection which betokens that the sentence is ended and silence The expression of the former state is hemming and hawing or else such phrases as *et cetera* or and so forth But notice that every part of the sentence to be left incomplete feels differently as it passes by reason of the premonition we have that we shall be unable to end it The and so forth casts its shadow back and is as integral a part of the object of the thought as the distinctest of images would be

Again when we use a common noun such as *man* in a universal sense, as sig nifying all possible men we are fully aware of this intention on our part, and distinguish it carefully from our intention when we mean a certain group of men or a solitary individual before us In the chapter on Conception we shall see how important this difference of intention is It casts its influence over the whole of the sentence both before and after the spot in which the word *man* is used

Nothing is easier than to symbolize all these facts in terms of brain action Just as the echo of the *whence* the sense of the starting point of our thought is probably due to the dying excitement of processes but a moment since vividly aroused so the sense of the whither the foretaste of the terminus must be due to the waxing excitement of tracts or processes which a moment hence will be the cerebral correlatives of some thing which a moment hence will be vividly present to the thought Represented by a curve the neurosis underlying con sciousness must at any moment be like this



FIG 27

Each point of the horizontal line stands for some brain tract or process The height of the curve above the line stands for the intensity of the process All the processes are *present* in the intensities shown by the curve But those before the latter s apex *were* more intense a moment ago those after it *will be* more intense a moment hence If I recite *a b c d e f g* at the moment of uttering *d* neither *a b c* nor *e f g* are out of my consciousness altogether but both after their

respective fashions, mix their dim lights with the stronger one of the *d*, because their neuroses are both awake in some degree.

There is a common class of mistakes which shows how brain processes begin to be excited before the thoughts attached to them are *due*—due, that is, in substantive and vivid form. I mean those mistakes of speech or writing by which, in Dr. Carpenter's words, "we mispronounce or misspell a word by introducing into it a letter or syllable of some other, whose turn is shortly to come; or it may be, the whole of the anticipated word is substituted for the one which ought to have been expressed."* In these cases one of two things must have happened: either some *local accident of nutrition blocks* the process that is *due*, so that other processes discharge that ought as yet to be but nascently aroused; or some opposite local accident *furthers* the *latter processes* and makes them explode before their time. In the chapter on Association of Ideas numerous instances will come before us of the actual effect on consciousness of neuroses not yet maximally aroused.

It is just like the 'overtones' in music. Different instruments give the 'same note,' but each in a different voice, because each gives more than that note, namely, various upper harmonics of it which differ from one instrument to another. They are not separately heard by the ear; they blend with the fundamental note, and suffuse it, and alter it; and even so do the waxing and waning brain-processes at every moment blend with and suffuse and alter the psychic effect of the processes which are at their culminating point.

Let us use the words *psychic overtone, suffusion,* or *fringe,* to designate the influence of a faint brain process upon our thought, as it makes it aware of relations and objects but dimly perceived.

If we then consider the *cognitive function* of different states of mind, we may feel assured that the difference between those that are mere 'acquaintance' and those that are 'knowledges-*about*' (see p. 144) is reducible almost entirely to the absence or presence of psychic fringes or overtones. Knowledge *about* a thing is knowledge of its relations. Acquaintance with it is limitation to the bare impression which it makes. Of most of its relations we are only aware in the penumbral nascent way of a 'fringe' of unarticulated affinities about it. And before passing to the next topic in order, I must say a little of this sense of affinity, as itself one of the most interesting features of the subjective stream.

* *Mental Physiology*, § 236. Dr. Carpenter's explanation differs materially from that given in the text.

In all our voluntary thinking there is some topic or subject about which all the members of the thought revolve Half the time this topic is a problem a gap we cannot yet fill with a definite picture word or phrase but which in the manner described some time back influences us in an intensely active and determinate psychic way Whatever may be the images and phrases that pass before us we feel their relation to this aching gap To fill it up is our thoughts destiny Some bring us nearer to that consummation Some the gap negates as quite irrelevant Each swims in a felt fringe of relations of which the aforesaid gap is the term Or instead of a definite gap we may merely carry a mood of interest about with us Then however vague the mood it will still act in the same way throwing a mantle of felt affinity over such representations entering the mind as suit it and tingeing with the feeling of tediousness or discord all those with which it has no concern

Relation then to our topic or interest is constantly felt in the fringe and particularly the relation of harmony and discord of furtherance or hindrance of the topic When the sense of furtherance is there we are all right with the sense of hindrance we are dissatisfied and perplexed and cast about us for other thoughts Now *any* thought the quality of whose fringe lets us feel ourselves all right is an acceptable member of our thinking whatever kind of thought it may otherwise be Provided we only feel it to have a place in the scheme of relations in which the interesting topic also lies that is quite sufficient to make of it a relevant and appropriate portion of our train of ideas

For the important thing about a train of thought is its conclusion That is the *meaning* or as we say the topic of the thought That is what abides when all its other members have faded from memory Usually this conclusion is a word or phrase or particular image or practical attitude or resolve whether rising to answer a problem or fill a pre-existing gap that worried us or whether accidentally stumbled on in revery In either case it stands out from the other segments of the stream by reason of the peculiar interest attaching to it This interest *arrests* it makes a sort of crisis of it when it comes induces attention upon it and makes us treat it in a substantive way

The parts of the stream that precede these substantive conclusions are but the means of the latter s attainment And provided the same conclusion be reached the means may be as mutable as we like for the meaning of the stream of thought will be the same What difference does it make what the means are? *Qu importe le flacon pourvu qu on ait l ivresse?* The relative unimportance of the means appears from the fact that when the conclusion is there we have always forgotten most of the steps preceding its attainment When we have uttered a proposition we are rarely able a moment afterwards to recall our exact words though we can express it in different words easily enough The practical upshot of a book we read remains with us though we may not recall one of its sentences

The only paradox would seem to lie in supposing that the fringe of felt affinity and discord can be the same in two heterogeneous sets of images Take a train of words passing through the mind and leading to a certain conclusion on the one hand and on the other hand an almost wordless set of tactile visual and other fancies leading to the same conclusion Can the halo fringe or scheme in which we feel the words to lie be the same as that in which we feel the images to

lie? Does not the discrepancy of terms involve a discrepancy of felt relations among them?

If the terms be taken *qua* mere sensations it assuredly does For instance the words may rhyme with each other —the visual images can have no such affinity as *that* But *qua* thoughts *qua* sensat ons *understood* the words have con tracted by lon association fringes of mutual repugnance or affinity with each other and with the conclusion which run exactly parallel with like frin es in the visual tactile and other ideas The most important element of these fringes is I repeat the mere feeling of harmony or discord of a right or wrong direction in the thought. Dr Campbell has so far as I know made the best analysis of this fact and his words often quoted deserve to be quoted again The chapter is entitled What is the cause that nonsense so often escapes being detected b h writer and by the reader The author in answering this question r

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Georg Campbell *Philo phy f Rhet ic* book II ch p

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t in a felt fringe of relations of which the aforesaid gap is the term Or instead of a definite gap we may merely carry a mood of interest about with us Then however vague the mood it will still act in the same way throwing a mantle of felt affinity over such representations entering the mind as suit it and tingeing with the feeling of tediousness or discord all those with which it has no concern

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The parts of the stream that precede these substantive conclusions are but the means of the latter s attainment And provided the same conclusion be reached the means may be as mutable as we like fo l
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l press it in different words easily enough The practical upshot of a book we read remains with us though we may not recall one of its sentences

The only paradox would m l affinity
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(an almost wordless set of tactile visual and other fancies leading to the same conclusion Can the halo fringe or scheme in which we feel the words to lie be the same as that in which we feel the images to

There are every year works published whose contents show them to be by real lunatics To the reader the book quoted from seems pure nonsense from begin nin to end It is impossible to divine in such a case just what sort of feeling of rational relation between the words may have appeared to the author s mind The border line between objective sense and nonsense is hard to draw that be- t h rti e sense and nonsense impossible Subjectively any collocation (a dream—if one only does
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wr ter as he penned them or even that some readers by s
produced it in themselves

To sum up certain kinds of verbal associate certain grammatical expecta tions fulfilled stand for a good part of our impression that a sentence has a mean ng and is dominated by the Unity of one Thought Nonsense in gram matical form sounds half rational sense with grammatical sequence upset sounds nonsensical e g Elba the Napoleon English faith had banished broken to he Saint because Helena at Finally there is about each word the psych c o ertone of feeling that it br ngs us nearer to a forefelt conclusion Suffuse all the words of a sentence as they pass with these three fringes or ha loes of relat o let the conclus on seem worth arriv ng at and all will admit the sentence to be an express on of thoroughly continuous unified and rational thought

Each word n such a sentence is felt not only as a word but as having a *meani g* The meaning of a word taken thus dynamically in a sentence may be quite d fferent from its meaning when taken statically or without context The dynam c meaning is usually reduced to the bare fringe we have described of felt su tability or unfitness to the context and conclusion The static mean ng when the word is concrete as table Boston consists of sensory images

signs would insensibly become connected in the imagination wherever the things signified are connected in nature so by the regular structure of a language this connection among the signs is conceived as analogous to that which subsisteth among their archetypes

If we know English and French and begin a sentence in French all the later words that come are French we hardly ever drop into English And this affinity of the French words for each other is not something merely operating mechanically as a brain law it is something we feel at the time Our understanding of a French sentence heard never falls to so low an ebb that we are not aware *that the words linguistically belong together* Our attention can hardly so wander that if an English word be suddenly introduced we shall not start at the change Such a vague sense as this of the words belonging together is the very minimum of fringe that can accompany them if thought at all Usually the vague perception that all the words we hear belong to the same language and to the same special vocabulary in that language and that the grammatical sequence is familiar is practically equivalent to an admission that what we hear is sense But if an unusual foreign word be introduced if the grammar trip of if a term from an incongruous vocabulary suddenly appear such as rat trap or 'plumber s bill in a philosophical discourse the sentence detonates as it were we receive a shock from the incongruity and the drowsy assent is gone The feeling of rationality in these cases seems rather a negative than a positive thing being the mere absence of shock, or sense of discord between the terms of thought

So delicate and incessant is this recognition by the mind of the mere fitness of words to be mentioned together that the slightest misreading such as casualty for causality or perpetual for perceptual will be corrected by a listener whose attention is so relaxed that he gets no idea of the *meaning* of the sentence at all

Conversely if words do belong to the same vocabulary and if the grammatical structure is correct sentences with absolutely no meaning may be uttered in good faith and pass unchallenged Discourses at prayer meetings reshuffling the same collection of cant phrases and the whole genus of penny a line isms and newspaper reporter s flourishes give illustrations of this The birds filled the tree-tops with their morning song making the air moist cool and pleasant is a sentence I remember reading once in a report of some athletic exercises in Jerome Park It was probably written unconsciously by the hurried reporter and read uncritically by many readers An entire volume of 784 pages lately published in Boston[1] is composed of stuff like this passage picked out at random

> The flow of the efferent fluids of all these vessels from their outlets at the terminal loop of each culminate link on the surface of the nuclear organism is continuous as their respective atmo pheric fruitage up to the altitudinal limit of their expansibility whence when atmosphered by like but coalescing essences from higher altitudes — those sensibly expressed as the essential qualities of external forms —they descend and become assimulated by the afferents of the nuclear organism[2]

[1] *Substa t ulism o Ph losophy of K owledge* by Je n St ry (18 9)

[2] M G Tarde quoti g (in Delbœuf *Le S mm l et l s d es* [1885] p 226) som n n sense v rses from a dream says they show how prosod c f rms may s b ist in a mind fr m which logical rules are eff ced I was able in dreamin t preserve the faculty of f nd ng

me f r the l ss of my hearing It was that of taking me with him when business re quired him to ride ab oad and h took me mo frequently than he did my b others gi ing as the reason f his appa ent partiality that they could acquire information through the ear while I depended olely upo my eye f r acquaintance w th affairs of the o side w ld.

I ha e a n d e llecti n of the del ht I felt in watching the different scenes we passed thr u h observin the arious pha es of nature both animate and inanimate though w did n t, owing to my infirmity engage in c n ersation. It was during those delightful rides some two or three years before my initiati n into the rudiments of wri ten langua that I be an t ask myself the question *How came th world to b ing?* When this questio occurr d to my mind, I set myself t thinking t o er a l ng time. My curiosity was wakened as to what was the origin of human life in its first appea anc upo th earth nd f veget ble life as well and also the cause of the existence of t

I emembe

happen d t

that ever came int th wo ld rose out of that stump n

nant of a nce n ble magnificent tree and how came that tr e? Why it came only by beginning t grow out f the ground j st like those little tr es n w comin up And I dismissed f m my mind, as an b urd dea, the c nnection between the origin of man and d ca ing ld stump

I ha e o ll tion of what t was that first suggested t me the q estio as t the origin of things I had befo this time gained deas f the des ent f om parent to child, of th p opagation of animals and f th p ductio of plants from eeds The qu d wa when cam the first man the first animal anc

n

e. bo t men, animals plants the earth, sun moon tc

ecei so much th u ht as was best wed upon man and the earth perhaps because I p t man and beast in th sam class since I belie ed that man would be annihilated and th re was o resurrecti bey d the gra —th ugh I am told by my mother that in ans t my q es in th ca f decea d uncl wh looked t me like pers in sleep he had tried t make m und rstand that he would wake in the far future It was my belief that man and beast deri d their bein f m the sam source, and were t be laid down in the dust in a state f annihilati n. Considerin the brute animal as f se ondary importanc and lied to man n low r le el man and the earth were th two things on which my mind dwelled mo t.

I think I was fi e years ld, when I began to understand the descent f om parent to hi d a d the p pagati f anim ls I was ea l el e years ld when I entered th Institut whe I was educ ted and I remembe distinctly that t was t least tw years befo this tim that I began t a k myself th question as to the rigin of th un erse M was then bo t ei ht not er nine years

Of th f rm f th earth, I had o dea in my childhood, ex ept that f m a l k at map f th hemisph es I inferred there wer tw immense disks of matter lying ear each other I also believed the un and moon t be und, flat pl tes f illuminat ing matte and f those luminaries I entertained sort f reverence on account of thei po er f lighting and heating th earth. I th ht from their coming up and going down, tra elling across the sky in so egular manner that there must be a cer tain something ha ing power to go ern their c urse. I believed the sun went int a hol t the west and came ut of an ther at th east, tra elling thr ugh great tube in the earth, describing the same cur as t seemed to describe in th sky The stars seemed to me to be tiny lights studded in the sky

awakened when it is abstract as criminal legislation fallacy the meaning consists of other words aroused forming the so called definition

Hegel s celebrated dictum that pure being is identical with pure nothing results from his taking the words statically or without the fringe they wear in a context Taken in isolation they agree in the single point of awakening no sensorial images But taken dynamically or as significant —as *thought* —their fringes of relation their affinities and repugnances their function and meaning are felt and understood to be absolutely opposed

Such considerations as these remove all appearance of paradox from those cases of extremely deficient visual imagery of whose existence Mr Galton has made us aware (see below) An exceptionally intelligent friend informs me that he can frame no image whatever of the appearance of his breakfast table When asked how he then remembers it at all he says he simply *knows* that it seated four people and was covered with a white cloth on which were a butter dish a coffee pot radishes and so forth The mind stuff of which this knowing is made seems to be verbal images exclusively But if the words coffee bacon ' muffins and eggs lead a man to speak to his cook to pay his bills and to take measures for the morrow s meal exactly as visual and gustatory memories would why are they not for all practical intents and purposes as good a kind of material in which to think? In fact we may suspect them to be for most purposes better than terms with a richer imaginative coloring The scheme of relationship and the conclusion being the essential things in thinking that kind of mind stuff which is handiest will be the best for the purpose Now words uttered or unexpressed are the handiest mental elements we have Not only are they very *rapidly* revivable but they are revivable as actual sensations more easily than any other items of our experience Did they not possess some such advantage as this it would hardly be the case that the older men are and the more effective as thinkers the more as a rule they have lost their visualizing power and depend on words This was ascertained by Mr Galton to be the case with members of the Royal Society The present writer observes it in his own person most distinctly

On the other hand a deaf and dumb man can weave his tactile and visual images into a system of thought quite as effective and rational as that of a word user *The question whether thought is possible without language* has been a favorite topic of discussion among philosophers Some interesting reminiscences of his childhood by Mr Ballard a deaf mute instructor in the National College at Washington show it to be perfectly possible A few paragraphs may be quoted here

> In consequence of the loss of my hearing in infancy I was debarred from enjoyin the advantages which children in the full possession of their senses deri e from the exercises of the common primary school from the every day talk of their school fellows and playmates and from the conversation of their parents and other grown up persons
>
> I could convey my thou hts and feelin s to my parents and brothers by natural signs or pantomime and I could understand what they said to me by the same medium our intercourse being however confined to the daily routine of home affairs and hardly going beyond the circle of my own observation
>
> My father adopted a course which he thought would in some measure compensate

which a number of thinkers start Let Z be the practical conclusion rationally inferrible from it One gets to the conclusion by one line another by another one follows a course of English another of German verbal imagery With one visual images predominate with another tactile Some trains are tinged with emotions others not some are very abridged synthetic and rapid others hesitating and broken into many steps But when the penultimate terms of all the trains however differing *inter se* finally shoot into the same conclusion we say and rightly say that all the thinkers have had substantially the same thought. It would probably astound each of them beyond measure to be let into his neighbor's mind and to find how different the scenery there was from that in his own.

Thought is in fact a kind of algebra as Berkeley long ago said in which though a particular quantity be marked by each letter yet to proceed right it is not requisite that in every step each letter suggest to your thoughts that particular quantity it was appointed to stand for Mr Lewes has developed this algebra analogy so well that I must quote his words

The leading characteristic of algebra is that of operation on relations. This also is the leading characteristic of Thought. Algebra cannot exist without values, nor Thought without Feelings. The operations are so many blank forms till the values are assigned. Words are vacant sounds, ideas are blank forms unless they symbolize images and sensations which are their values Nevertheless it is rigorously true and of t[...] that analysts carry on very extensive operations with blank

the word is not only an expression of all that he has seen and heard of ... capable of ... various experience but is also capable of taking its place in a connected series of thoughts without recalling any of those experiences, without re-

lated ... fear with all its motor sequences. Its logical position suffices. Ideas are

able two—the man and his enemy—and these images were faint. Images of blood, heart, ... pulse quickening and ... were either not revived at all or were passing shadows. Had any such images arisen, they would have hampered thought retarding the logical process of judgment by irrelevant connections The symbols had substituted relations for these images There are no images of two things and three things when I say two and three equal five, there are simply f

The source from which the universe came was the question about which my mind revolved in a vain struggle to grasp it or rather to fight the way up to attain to a satisfactory answer When I had occupied myself with this subject a considerab e time I perceived that it was a matter much greater than my mind could comprehend and I remember well that I became so appalled at its mystery and so bewildered at my inability to grapple with it that I laid the subject aside and out of my mind glad to escape being as it were drawn into a vortex of inextricable confusion Though I felt relieved at this escape yet I could not resist the desire to know the truth and I returned to the subject but as before I left it after thinking it over for some time. In this state of perplexity I hoped all the time to get at the truth still believing that the more I gave thought to the subject the more my mind would penetrate the mys tery Thus I was tossed like a shuttlecock returning to the subject and recoiling from it till I came to school

I remember that my mother once told me about a being up above pointing her finger towards the sky and with a solemn look on her countenance. I do not recall the circumstance which led to this communication When she mentioned the mysterious being up in the sky I was eager to take hold of the subject and plied her with ques tions concerning the form and appearance of this unknown being asking if it was the sun moon or one of the stars I knew she meant that there was a living one some where up in the sky but when I realized that she could not answer my questions I gave it up in despair feeling sorrowful that I could not obtain a definite idea of the mysterious living one up in the sky

One day while we were haying in a field there was a series of heavy thunder claps. I asked one of my brothers where they came from He pointed to the sky and made a zigzag motion with his finger signifying lightning I imagined there was a great man somewhere in the blue vault who made a loud noise with his voice out of it and each time I heard[1] a thunder clap I was frightened and looked up at the sky fearing he was speaking a threatening word[2]

Here we may pause The reader sees by this time that it makes little or no dif ference in what sort of mind stuff in what quality of imagery his thinking goes on The only images *intrinsically* important are the halting places the substan tive conclusions provisional or final of the thought Throughout all the rest of the stream the feelings of relation are everything and the terms related almost naught These feelings of relation these psychic overtones halos suffusions or fringes about the terms may be the same in very different systems of imagery A dia gram may help to accentuate this indiffer ence of the mental means where the end is the same Let *A* be some experience from



FIG 28

[1] Not literally *heard* f course Deaf mutes are quick to percei e shocks and jars that can be felt, even when s slight as to be unn t ced by those who can hear

[2] Quoted by Sam l l te Is Thought Poss ble without Langu g ? in *P ceton Re* *t eu* 57th year pp 108–12 (Jan 1881?) *Cf* also W W Ireland *The Bl t upon the B ain* (1886) Paper \ part II G J Romanes *Me tal Evol t o n Man* pp 8 –83 d refer ences th rein made Prof Max Muller gives a very complete history of this c ntro ersy in

t

t — h logical point of view th t h l cannot go A mind wh ch

i

ut it knows that it knows them This sta e

less expl citly our habitual adult state of mind

It cannot however be regarded as prim tive The consciou ness of objects must come first We seem to lap e into this primordial condit on when consciousness is educed to a minimum by the nhalation of anæsthetics or during a faint. Many persons testify that at a certain stage of the anæsthetic process objects a e still cognized whil t the thought of self is lost Professor Herzen says

D ring the ync p there s ab c s ous ess th n at the beginn n of limitles infinit f eling— s n e distinctio between the me and the n t me.

Dr Shoemaker of Ph ladelph a describes during the deepest conscious stage of ether intoxication a v sion of n a unif rm misty back tw en not loud but distinct g und These ph nomena occu- hi h p d the whole fi ld. Th re w re present o dreams or visions in any way on ected with human aff irs deas r imp e s ons akin to anything n past exper ence no m ti s f c u no dea of pers lity There was o on eptu n as to what being it w that was ga di g the two lines o th t th re existed any such thing as such a being th l s and w ves we all

S mila

p 556)

presence

sense of objectivity and lapse of subjectiv ty even when the object is almost indefinable is it seems to me a somewhat famil ar phase in chloroformization though n my own case it is too deep a phase for any articulate after memory

self essential to the com ti e function of thought They hold that a thought in order to know a th n at all must expressly distinguish between the thing d ts own self This is a perfectly wanton assumpt on and not the faintest

Revue ph lo ph q l xxi p 67

Quot d f m th *Ther p utic Ga. tt* by th N Y S m weekly E g P t f N v 886

l h lf t nned states lf-c nsci us ess m y l pse A fri d writes me W we driv- g ba k f m —— in w ett Th doo fl w pe and X l as Baldy f ll t th ro d W pulled p t ce and then h sa d D d anybody f ll t? Wh f ll t?— I d t xactly rem mbe th w ds When t ld th t B ldy f ll t h said 'Did Baldy fall ou ? Poo B ldy!

Kant mana ed this new I bj f w E glish tat ments f t J F *I stutes f M physic* Propositio Al g w th wh t any telligen kn ws t must as the

neighing or its tramp its qualities as an animal of draught and so forth [1]

It need only be added that as the algebrist though the sequence of his terms is fixed by their relations rather than by their several values must give a real value to the *final* one he reaches so the thinker in words must let his concluding word or phrase be translated into its full sensible image-value, under penalty of the thought being left unrealized and pale

This is all I have to say about the sensible continuity and unity of our thought as contrasted with the apparent discreteness of the words images and other means by which it seems to be carried on Between all their substantive elements there is transitive consciousness and the words and images are fringed and not as discrete as to a careless view they seem Let us advance now to the next head in our description of Thought s stream

4 *Human thought appears to deal with objects independent of itself that is it is cognitive or possesses the function of knowing*

For Absolute Idealism the infinite Thought and its objects are one The Objects are through being thought the eternal Mind is through thinking them Were a human thought alone in the world there would be no reason for any other assumption regarding it Whatever it might have before it would be its vision would be there in *its* there or then in *its* then and the question would never arise whether an extra mental duplicate of it existed or not The reason why we all believe that the objects of our thoughts have a duplicate existence outside is that there are *many* human thoughts each with the *same* objects as we cannot help supposing The judgment that *my* thought has the same object as *his* thought is what makes the psychologist call my thought cognitive of an outer reality The judgment that my own past thought and my own present thought are of the same object is what makes *me* take the object out of either and project it by a sort of triangulation into an independent position from which it may *appear* to both *Sameness* in a multiplicity of objective appearances is thus the basis of our belief in realities outside of thought [2] In Chapter XII we shall have to take up the judgment of sameness again

To show that the question of reality being extra mental or not is not likely to arise in the absence of repeated experiences of the *same* take the example of an altogether unprecedented experience such as a new taste in the throat Is it a subjective quality of feeling or an objective quality felt? You do not even ask the question at this point It is simply *that taste* But if a doctor hears you describe it and says Ha! Now you know what *heartburn* is then it becomes a quality already existent *extra mentem tuam* which you in turn have come upon and learned The first spaces times things qualities experienced by the child probably appear like the first heartburn in this absolute way as simple *beings* neither in nor out of thought But later by having other thoughts than this present one and making repeated judgments of sameness among their objects he corroborates in himself the notion of realities past and distant as well as pres-

[1] *Problems of Life and Mind* 3d Series Problem II chap 5 Cf also Victor Egger *La Parole intérieure* (Paris 1881) chap VI

[2] If but one person sees an apparition we consider it his private hallucination If more than one we begin to think it may be a real external presence

must mal ~ h intive of it by writing it out thus with hyphens between all its words ~ its delicate idiosyncrasy And if we wi uttered nal halo of obscure meaning

Our psycholo~ical duty tion of the thought we are If the kernel or topic, Columbus is in one way less than ~ so in another way it may be more. That is, when named by the psychologist it may mean much present to the thought of which he is reporter Thus darin~ genius object of your thought was sum ~ lumbus. It terminates in Columbus leads from and to the unt Columbus. But for the moment it is not fully and immediately Columbus, it is only he or rather he-was-a-daring genius which though it may be an unimportant difference for conversational purposes is for introspective psy c ~ as great a difference as there can be her more nor less than all that the

has passed from before the mind it enlict ~ best plan is to repeat the verbal sentence if there was one in which the object was expressed But for inarticulate thoughts there is not even this resource and introspection must confess that the task exceeds her powers The mass of our thinkin vanishes for ever beyond hope of recovery and psychology only gathers up a few of the crumbs that fall from the feast.

The next point to make clear is that, *however complex the object may be the thou ht of it is one undivided state of consciousness* As Thomas Brown says [1]

> I ha already poken to ~ to cauti n you against th mistake in which, I confess, that use might of them el es most mplex states f m indi isible as those which hich they m of e bein ~ ture. I trust I need not repeat to you that, in itself e ery n ti n, however eemingly c mplex, is and must be truly simple—being o e tate r affection, f one simpl substance, mind. Our conception f whole army for example, is as truly this one mind existing in this on state as our con eptu n f any of th indi duals that com pose an army Our notion of th abstract numbers, eight four two is as truly one feeling f the mind as ur n tion f simpl unity

The ordinary associationist-psychology supposes in contrast with this, that whenever an object of thought contains many elements the thought itself must

[1] *Lectures on the Philosophy f the H ma Mind* Lecture 45

Instead of saying t ~ f ~ing only h sh uld ha said, t the bj ct only

shadow of reason exists for supposing it true As well might I contend that I cannot dream without dreaming that I dream swear without swearing that I swear deny without denying that I deny as maintain that I cannot know without knowing that I know I may have either acquaintance-with or knowledge-about an object O without thinking about myself at all It suffices for this that I think O and that it exist If in addition to thinking O I also think that I exist and that I know O well and good I then know one more thing a fact about O of which I previously was unmindful That however does not prevent me from having already known O a good deal O *per se* or O *plus* P are as good objects of knowledge as O *plus me* is The philosophers in question simply substitute one particular object for all others and call it *the* object *par excellence* It is a case of the psychologist s fallacy (see p 128) *They* know the object to be one thing and the thought another and they forthwith foist their own knowledge into that of the thought of which they pretend to give a true account To conclude then *thought may but need not in knowing discriminate between its object and itself*

We have been using the word Object *Something must now be said about the proper use of the term Object in Psychology*

In popular parlance the word object is commonly taken without reference to the act of knowledge and treated as synonymous with individual subject of existence Thus if anyone ask what is the mind s object when you say Columbus discovered America in 1492 most people will reply Columbus or America or at most the discovery of America They will name a substantive kernel or nucleus of the consciousness and say the thought is about that —as indeed it is —and they will call that your thought s object Really that is usually only the grammatical object or more likely the grammatical subject of your sentence It is at most your fractional object or you may call it the topic of your thought or the subject of your discourse But the *Object* of your thought is really its entire content or deliverance neither more nor less It is a vicious use of speech to take out a substantive kernel from its content and call that its object and it is an equally vicious use of speech to add a substantive kernel not articulately included in its content and to call that its object Yet either one of these two sins we commit whenever we content ourselves with saying that a given thought is simply about a certain topic or that that topic is its object The object of my thought in the previous sentence for example is strictly speaking neither Columbus nor America nor its discovery It is nothing short of the entire sentence Columbus-discovered America in 1492 And if we wish to speak of it substantively we

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ground [illegible] condition of its kno[illegible] d[illegible] e have some knowled[illegible] e of itself Sir Wm Hamilton *Discussions* p 47 We know and we know that we know —these proposit[illegible] o[illegible] s, logically di[illegible] tinct are re[illegible] ch [illegible] the other So true is the s[illegible] holastic brocard *non sent[illegible] mus* [illegible]

[illegible] ety of materia [illegible]

by recognizing [illegible]

universal featu[illegible] e which every state [illegible] f c[illegible] nsc[illegible] us[illegible] ss [illegible] s such m[illegible] t exh[illegible] b[illegible] t T H Gree[illegible] *I[illegible] t[illegible] od[illegible] ct[illegible] o[illegible] to H[illegible] me* p 12 [illegible] the m[illegible] n [illegible] h[illegible] mself [illegible] ga[illegible] e rela tion to the th[illegible] n[illegible] that is his object

perceptive act itself Not less th[illegible]

beginnin[illegible] of knowledge at all It is the m[illegible] n[illegible] m[illegible] m [illegible]

thought is and what it may be developed into or explained to stand for and be equivalent to are two things not one

An analysis of what passes through the mind as we utter the phrase *the pack of cards is on the ta* ... h clear and may at the same time condense into a con

It takes time to

time. Every part o

of the time Of course the in

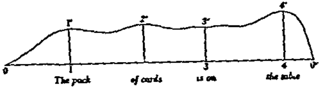


FIG. 9 Th tream f consci usness.

continuous with 1–2 is yet a different part from 1–2 Now I say of these time-parts that we cannot take any one of them so short that it will not after some fashion or other be a thought of the whole object the pack of cards is on the table. They melt into each other like dissolving views, and no two of them feel *the object* just alike, but each feels the total object in a unitary undivided way This is what I mean by denying that in the thought any parts can be found corresponding to the object s parts Time-parts are not such parts

Now let the vertical dimensions of the figure stand for the objects or contents of the thoughts. A line vertical to any point of the horizontal, as 1–1 will then symbolize the object in the mind at the instant 1 a space above the horizontal, as 1 1 –2 –2 will symbolize all that passes through the mind during the time 1–2 whose line t covers. The entire diagram from 0 to 0 represents a finite length of t

Can we now de

segment? We can

we have opened our mouths to speak, the entire thought is present ... in the form of an intention to utter that sentence. This intention, though it has no simple name and though it is a transitive state immediately displaced by the first word is yet a perfectly determinate phase of thought, unlike anything else (see p 164) Again immediately before 0 after the last word of the sentence is spoken all will admit that we again think its entire content as we inwardly realize its completed deliverance All vertical sections made through any other parts of the diagram will be respectively filled with othe ways of feeling the

1

Dismiss the thought and t go its parts. ... can no more make ... "ideas that have once served than y can make new bubble ut of old triangles. Each bubble, each thought, is fresh ganic unity *sui generis*

be made up of just as many ideas one idea for each element and all fused together in appearance but really separate [1] The enemies of this psychology find (as we have already seen) little trouble in showing that such a bundle of separate ideas would never form one thought at all and they contend that an Ego must be added to the bundle to give it unity and bring the various ideas into relation with each other We will not discuss the ego just yet but it is obvious that if things are to be thought in relation they must be thought together and in one *something* be that something ego psychosis, state of consciousness or whatever you please If not thought with each other things are not thought in relation at all Now most believers in the ego make the same mistake as the associationists and sensationists whom they oppose Both agree that the elements of the subjective stream are discrete and separate and constitute what Kant calls a manifold But while the associationists think that a ' manifold can form a single knowledge the egoists deny this and say that the knowledge comes only when the manifold is subjected to the synthetizing activity of an ego Both make an identical initial hypothesis but the egoist finding it won t express the facts adds another hypothesis to correct it Now I do not wish just yet to commit myself about the existence or non existence of the ego but I do contend that we need not invoke it for this particular reason—namely because the manifold of ideas has to be reduced to unity *There is no manifold of coexisting ideas* the notion of such a thing is a chimera *Whatever things are thought in relation are thought from the outset in a unity in a single pulse of subjectivity a single psychosis feeling or state of mind*

The reason why this fact is so strangely garbled in the books seems to be what on an earlier page (see p 128 ff) I called the psychologist s fallacy We have the inveterate habit whenever we try introspectively to describe one of our thoughts of dropping the thought as it is in itself and talking of something else We describe the things that appear to the thought and we describe other thoughts *about* those things—as if these and the original thought were the same If for example the thought be the pack of cards is on the table we say Well isn t it a thought of the pack of cards? Isn t it of the cards as included in the pack? Isn t it of the table? And of the legs of the table as well? The table has legs—how can you think the table without virtually thinking its legs? Hasn t our thought then all these parts—one part for the pack and another for the table? And within the pack part a part for each card as within the table-part a part for each leg? And isn t each of these parts an idea? And can our thought then be anything but an assemblage or pack of ideas each answering to some element of what it knows?

Now not one of these assumptions is true The thought taken as an example is in the first place not of a pack of cards It is of the-pack-of-cards-is-on-the-table an entirely different subjective phenomenon whose Object implies the pack and every one of the cards in it but whose conscious constitution bears very little resemblance to that of the thought of the pack *per se* What a

[1] There can be no difficulty in admitting that association does form the ideas of an indefinite number of individuals into one complex idea because it is an acknowledged fact. Have we not the idea of an army? And is not that precisely the ideas of an indefinite number of men formed into one idea? (James Mill *Analysis of the Human Mind* (J S Mill s Edition) vol. I, p. 264)

ject present to the cross-section thus suddenly made, you will find, not the bald word in process of utterance, but that word suffused with the whole idea. The word may be so loud, as M. Egger would say, that we cannot *tell* just how its suffusion, as such, feels, or how it differs from the suffusion of the next word. But it does differ; and we may be sure that, could we see into the brain, we should find the same processes active through the entire sentence in different degrees, each one in turn becoming maximally excited and then yielding the momentary 'verbal' kernel, to the thought's content, at other times being only sub-excited, and then combining with the other sub-excited processes to give the overtone or fringe.

We may illustrate this by a farther development of the diagram on p. 181. Let the objective content of any vertical section through the stream be represented no longer by a line, but by a plane figure, highest opposite whatever part of the object is *most prominent in consciousness* at the moment when the section is made. This part, in verbal thought, will usually be some word. A series of sections 1-1, taken at the moments 1, 2, 3, would then look like this:



FIG. 32.

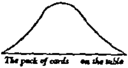


FIG. 32.



FIG. 32.

The horizontal breadth stands for the entire object in each of the figures; the height of the curve above each part of that object marks the relative prominence of that part in the thought. At the moment symbolized by the first figure *pack* is the prominent part; in the third figure it is *table*, etc.

We can easily add all these plane sections together to make a solid, one of whose solid dimensions will represent time, whilst a cut across this at right angles will give the thought's content at the moment when the cut is made. Let it be the thought, 'I am the same I that I was yesterday.' If at the fourth mo-

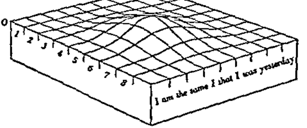


FIG. 33.

ment of time we annihilate the thinker and examine how the last pulsation of his consciousness was made, we find that it was an awareness of the whole content with *same* most prominent, and the other parts of the thing known relatively

* The nearest approach (with which I am acquainted) to the doctrine set forth here is in O. Liebmann, *Zur Analysis der Wirklichkeit*, pp. 427-38.

sentence's meaning. Through 2, for example, the cards will be the part of the object most emphatically present to the mind; through 4, the table. The stream is made higher in the drawing at its end than at its beginning, because the final way of feeling the content is fuller and richer than the initial way. As Joubert says, "We only know just what we meant to say after we have said it." And as M. V. Egger remarks, "before speaking, one barely knows what one intends to say, but afterwards one is filled with admiration and surprise at having said and thought it so well."

This latter author seems to me to have kept at much closer quarters with the facts than any other analyst of consciousness.[1] But even he does not quite hit the mark, for, as I understand him, he thinks that each word as it occupies the mind *displaces* the rest of the thought's content. He distinguishes the "idea" (what I have called the total *object* or meaning) from the consciousness of the words, calling the former a very feeble state, and contrasting it with the liveliness of the words, even when these are only silently rehearsed. "The feeling," he says, "of the words makes ten or twenty times more noise in our consciousness than the sense of the phrase, which for consciousness is a very slight matter."[2] And having distinguished these two things, he goes on to separate them in time, saying that the idea may either precede or follow the words, but that it is a "pure illusion" to suppose them simultaneous.[3] Now I believe that in all cases where the words are *understood*, the total idea may be and usually is present not only before and after the phrase has been spoken, but also whilst each separate word is uttered.[4] It is the overtone, halo, or fringe of the word, *as spoken in that sentence*. It is never absent; no word in an understood sentence comes to consciousness as a mere noise. We feel its meaning as it passes; and although our object differs from one moment to another as to its verbal kernel or nucleus, yet it is *similar* throughout the entire segment of the stream. The same object is known everywhere, now from the point of view, if we may so call it, of this word, now from the point of view of that. And in our feeling of each word there chimes an echo or foretaste of every other. The consciousness of the "Idea" and that of the words are thus consubstantial. They are made of the same "mind-stuff," and form an unbroken stream. Annihilate a mind at any instant, cut its thought through whilst yet uncompleted, and examine the ob-

[1] In his work *La Parole intérieure* (Paris, 1881), especially chapters vi and vii.

[2] *Op. cit.*, p. 301.

[3] *Op. cit.*, p. 218. To prove this point M. Egger appeals to the fact that we often hear some one speak whilst our mind is preoccupied, but do not understand him until some moments afterwards, when we suddenly "realize" what he meant. Also to our digging out the meaning of a sentence in an unfamiliar tongue where the words are present to us long before the idea is taken in. In these peculiar cases the words do indeed precede the idea. The idea, on the contrary, precedes the words whenever we try to express ourselves with effort, as in a foreign tongue or in an unusual field of intellectual invention. Both sets of cases, however, are exceptional, and M. Egger would probably himself admit, on reflection, that in the former class there is some sort of a verbal suffusion, however evanescent, of the idea when it is grasped—we hear the echo of the words as we catch their meaning. And he would probably admit that in the second class of cases the idea persists after the words that came with so much effort are found. In normal cases the simultaneity, as he admits, is obviously the

[4] A good way to get the words and the sense separately is to inwardly articulate word for word the discourse of another. One then finds that the meaning will often come to the mind in pulses, after clauses or sentences are finished.

more than a study of those visual sensations of which common men never become aware—blind spots *muscæ volitantes* after images irradiation chromatic fringes marginal chan es of color double images astigmatism movements of accommodation and convergence retinal rivalry and more besides. We do not even know without special trainin on which of our eyes an image falls So habitually ignorant are most men of this that one may be blind for years of a single eye and ne er know the fact

Helmholtz says that we notice only those sensations which are signs to us of *things* But what are things? Nothing as we shall abundantly see but special groups of sensible qualities which happen practically or æsthetically to interest us to which we therefore gi e substantive names and which we exalt to this exclu ve status of ndependence and dignity But in itself apart from my interest a particular dust wreath on a windy day is just as much of an individual thing and just as much or as little deserves an individual name as my own body does

And then among the sensations we get from each separate thing what happens? The mind selects again It chooses certain of the sensations to represent the thing most *truly* and considers the rest as its appearances modified by the conditions of the moment Thus my table-top is named *square* after but one of an infinite numbe of retinal sensations wh ch it yields the rest of them b n sensations of two acute and two obtuse an les but I call the latter *per* h *tr e* form of the table and erect

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when the line of vision is perpendi ula ... the cannon is the sensation it are signs of this sensation The real sound of the cannon is the sensation it makes when the ear is close by The real color of the b ck is the sensation it gi es when the eye looks squarely at it from a near point out of the sunshine and yet not in the gloom under other circumstances it gives us other color sensat ons which are but signs of this—we then see it looks pinker or blacker than t really is The reader knows no ob ect which he does not represent to h mself by prefe ence as i some typical at characteristic distance of some standard charact rist cs which to ether form f r u and are contra ted w th what we call th and are contra ted w th what we call th at a gi en moment are mere sensations like the latter The mind chooses to suit tself and decides what particular sensation shall be held more real and al d than all the rest

Thus perception invol es a twofold choice Out of all present sensations we not ce mainly such as are s gnificant of absent ones and out of all the absent associates which these suggest we again p ck ut a very few to stand for the objecti e reality *pa excellence* We could ha e no more exquisite example of selecti e industry

That industry goes on to deal with the things thus given in perception. A man s empirical tho ght depends on the things he has experienced but what these shall be is to a large extent determined by his hab ts of attention. A thing may be p ese t to him thousand times but if he persistently f ils to notice it, t cannot be said to enter into his experience We are all seeing flies moths and beetles by the thousand but to whom sa e an entomologist do they say any

tively less distinct With each prolongation of the scheme in the time-direction the summit of the curve of section would come further towards the end of the sentence If we make a solid wooden frame with the sentence written on its front and the time-scale on one of its sides if we spread flatly a sheet of India

the changing of the thought s content in a way plain enough after what has been said to call for no more explanation Or to express it in cerebral terms it will show the relative intensities at successive moments of the several nerve-processes to which the various parts of the thought object correspond

The last peculiarity of consciousness to which attention is to be drawn in this first rough description of its stream is that

5 *It is always interested more in one part of its object [thou ht] than in an other and welcomes and rejects or chooses all the while it thinks*

The phenomena of selective attention and of deliberative will are of course patent examples of this choosing activity But few of us are aware how inces santly it is at work in operations not ordinarily called by these names Accen tuation and Emphasis are present in every perception we have We find it quite impossible to disperse our attention impartially over a number of impressions A monotonous succession of sonorous strokes is broken up into rhythm now of one sort now of another by the different accent which we place on different strokes The simplest of these rhythms is the double one tick tock tick tock tick tóck Dots di persed on a surface are perceived in rows and groups Lines separate into diverse figures The ubiquity of the distinctions *this* and *that* *here* and *there* *now* and *then* in our minds is the result of our laying the same selective emphasis on parts of place and time

But we do far more than emphasize things and unite some and keep others apart We actually *ignore* most of the things before us Let me briefly show how this goes on

To begin at the bottom what are our very senses themselves but organs of selection? Out of the infinite chaos of movements of which physics teaches us that the outer world consists each sense-organ picks out those which fall within certain limits of velocity To these it respond but ignores the rest as com pletely as if they did not exist It thus accentuates particular movements in a manner for which objectively there seems no valid ground for as Lange says there is no reason whatever to think that the gap in Nature between the highest sound waves and the lowest heat waves is an abrupt break like that of our sen sations or that the difference between violet and ultra violet rays has any thing like the objective importance subjectively represented by that between light and darkness Ou of what is in it elf an undistinguishable swarming *con tinuum* devoid of distinction or emphasis our senses make for us by attending to this motion and ignoring that a world full of contrasts of sharp accents of abrupt changes of picturesque light and shade

If the sensations we receive from a given organ have their causes thus picked out for us by the conformation of the organ s termination Attention on the other hand out of all the sensations yielded picks out certain ones as worthy of its notice and suppresses all the rest Helmholtz s work on Optics is little

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the character itself The problem with the man is less what act he shall now choose to do than what being he shall now resolve to become

Looking back, then over this review we see that the mind is at every stage a theatre of simultaneous possibilities Consciousness consists in the comparison of these with each other the selection of some and the suppression of the rest by the reinforcing and inhibiting agency of attention. The highest and most elaborated mental products are filtered from the data chosen by the faculty next beneath out of the mass offered by the faculty below that which mass in turn *was sifted from a still larger amount of yet simpler material* and so on. The mind, in short, works on the data it receives very much as a sculptor works on his block of stone. In a sense the statue stood there from eternity But there were a thousand different ones beside it, and the sculptor alone is to thank for having extricated this one from the rest. Just so the world of each of us howsoever different our several views of it may be, all lay embedded in the primordial chaos of sensations, which gave the mere *matter* to the thought of all of us indifferently We may if we like by our reasonings unwind things back to that black and jointless continuity of space and moving clouds of swarming atoms which science calls the only real world. But all the while the world *we* feel and live in will be that which our ancestors and we, by slowly cumulative strokes of choice have extricated out of this like sculptors by simply rejecting certain portions of the given stuff Other sculptors other statues from the same stone! Other minds other worlds from the same monotonous and inexpressive chaos! My world is but one in a million alike embedded alike real to those who may abstract them. How different must be the worlds in the consciousness of ant cuttle-fish or crab!

But in my mind and your mind the rejected portions and the selected portions of the original world-stuff are to a great extent the same The human race as a whole largely agrees as to what it shall notice and name and what not And among the noticed parts we select in much the same way for accentuation and preference or subordination and dislike. There is however one entirely extraordinary case in which no two men ever are known to choose alike. One great splitting of the whole universe into two halves is made by each of us and for each of us al[illegible] [illegible] interest attaches to one of the halves but we all draw the line [illegible]
two [illegible]
specu[illegible]
terest which each human mind feels in those parts of creation which it can call *me or mine may be a moral riddle* but it is a fundamental psychological fact. No mind can take the same interest in his neighbor's *me* as in his own. The neighbor's me falls together with all the rest of things in one foreign mass against which his own *me* stands out in startling relief Even the trodden worm as Lotze somewhere says contrasts his own suffering self with the whole remaining universe though he have no clear conception either of himself or of what the universe may be He is for me a mere part of the world for him it is I who am

ha[s] thus once more been led.

thing distinct? On the other hand a thing met only once in a lifetime may leave an indelible experience in the memory Let four men make a tour in Europe. One will bring home only picturesque impressions—costumes and colors parks and views and works of architecture pictures and statues To another all this will be non existent and distances and prices populations and drainage arrangements door and window fastenings and other useful statistics will take their place A third will give a rich account of the theatres restaurants and public balls and naught beside whilst the fourth will perhaps have been so wrapped in his own subjective broodings as to tell little more than a few names of places through which he passed Each has selected out of the same mass of presented objects those which suited his private interest and has made his experience thereby

If now leaving the empirical combination of objects we ask how the mind proceeds *rationally* to connect them we find selection again to be omnipotent In a future chapter we shall see that all reasoning depends on the ability of the mind to break up the totality of the phenomenon reasoned about into parts and to pick out from among these the particular one which in our given emergency may lead to the proper conclusion Another predicament will need another conclusion and require another element to be picked out The man of genius is he who will always stick in his bill at the right point and bring it out with the right element— reason if the emergency be theoretical means if it be practical—transfixed upon it I here confine myself to this brief statement but it may suffice to show that Reasoning is but another form of the selective activity of the mind

If now we pass to its æsthetic department our law is still more obvious The artist notoriously selects his items rejecting all tones colors shapes which do not harmonize with each other and with the main purpose of his work That unity harmony convergence of characters as M Taine calls it which gives to works of art their superiority over works of nature is wholly due to *elimination* Any natural subject will do if the artist has wit enough to pounce upon some one feature of it as characteristic and suppress all merely accidental items which do not harmonize with this

Ascending still higher we reach the plane of Ethics where choice reigns notoriously supreme An act has no ethical quality whatever unless it be chosen out of several all equally possible To sustain the arguments for the good course and keep them ever before us to stifle our longing for more flowery ways to keep the foot unflinchingly on the arduous path these are characteristic ethical energies But more than these for these but deal with the means of compassing interests already felt by the man to be supreme The ethical energy *par excellence* has to go farther and choose which *interest* out of several equally coercive shall become supreme The issue here is of the utmost pregnancy for it decides a man s entire career When he debates Shall I commit this crime? choose that profession? accept that office or marry this fortune?—his choice really lies between one of several equally possible future characters What he shall *become* is fixed by the conduct of this moment Schopenhauer who enforces his determinism by the argument that with a given fixed character only one reaction is possible under given circumstances forgets that in these critical ethical moments what consciously *seems* to be in question is the complexion of

tify ourselves with them that there are few of us who if asked to choose between having a beautiful body clad in raiment perpetually shabby and unclean and having an ugly and blemished form always spotlessly attired would not hesitate a moment before making a decisive reply Next, our immediate family is a part of ourselves. Our father and mother our wife and babes are bone of our bone and flesh of our flesh When they die a part of our very selves is gone. If they do anythin wrong it is our shame If they are insulted, our anger flashes forth as readily as if we stood in their place Our home comes next. Its scenes are part of our life its aspects awaken the tenderest feelings of affection and we do not easily forgive the stranger who in visiting it finds fault with its arrangements or treats it with contempt All these different things are the objects of instinctive preferences coupled with the most important practical interests of life. We all have a blind impulse to watch over our body to deck it with clothing of an ornamental sort, to cherish parents, wife and babes and to find for our selves a home of our own which we may live in and improve.

An equally instinctive impulse drives us to collect property and the collections thus made become, with different degrees of intimacy parts of our empirical selves The parts of our wealth most intimately ours are those which are saturated with our labor There are few men who would not feel personally annihilated if a life-lon construction of their hands or brains—say an entomological collection or an extensive work in manuscript—were suddenly swept away The miser feels similarly towards his gold and although it is true that a part of our depression at the loss of possessions is due to our feeling that we must now go without certain goods that we expected the possessions to bring in their train, yet in every case there remains over and above this a sense of the shrinkage of our personality a partial conversion of ourselves to nothingness which is a psy [illegible] at once assimilated to the tramps

[illegible]

in the full blown lustihood that wealth [illegible] stiffen ourselves as we will by appealing to anti snobbish first principles we cannot escape an emotion, open or sneaking of respect and dread.

b) *A man's Social Self* is the recognition which he gets from his mates. We are not only gregarious animals, liking to be in sight of our fellows but we have an innate propensity to get ourselves noticed and noticed favorably by our kind No more fiendish punishment could be devised were such a thing physically possible than that one should be turned loose in society and remain absolutely unnoticed by all the members thereof If no one turned round when we entered answered when we spoke, or minded what we did but if every person we met cut us dead and acted as if we were non-existing things a kind of rage and impotent despair would ere long well up in us from which the cruellest bodily tortures would be a relief for these would make us feel that however bad might be our plight we had not sunk to such a depth as to be unworthy of attention at all

Properly speaking *a man has as many social selves as there are individuals*

See, [illegible] charming passage on the Philosophy of Dress, H. Lotze *Microcosmo* Eng. tr vol. I, p. 592 ff.

Chapter X

THE CONSCIOUSNESS OF SELF

LET us begin with the Self in its widest acceptation and follow it up to its most delicate and subtle form advancing from the study of the empirical as the Germans call it to that of the pure Ego

The Empirical Self or Me

The Empirical Self of each of us is all that he is tempted to call by the name of *me* But it is clear that between what a man calls *me* and what he simply calls *mine* the line is difficult to draw We feel and act about certain things that are ours very much as we feel and act about ourselves Our fame our children the work of our hands may be as dear to us as our bodies are and arouse the same feelings and the same acts of reprisal if attacked And our bodies themselves are they simply ours or are they *us?* Certainly men have been ready to disown their very bodies and to regard them as mere vestures or even as prisons of clay from which they should some day be glad to escape

We see then that we are dealing with a fluctuating material The same object being sometimes treated as a part of me at other times as simply mine and then again as if I had nothing to do with it at all *In its widest possible sense* however *a man s Self is the sum total of all that he can call his* not only his body and his psychic powers but his clothes and his house his wife and children his ancestors and friends his reputation and works his lands and horses and yacht and bank account All these things give him the same emotions If they wax and prosper he feels triumphant if they dwindle and die away he feels cast down —not necessarily in the same degree for each thing but in much the same way for all Understanding the Self in this widest sense we may begin by dividing the history of it into three parts relating respectively to—

1 Its constituents
2 The feelings and emotions they arouse —*Self feelings*
3 The actions to which they prompt —*Self seeking and Self preservation*

1 *The constituents of the Self* may be divided into two classes those which make up respectively—

a) The material Self
b) The social Self
c) The spiritual Self
d) The pure Ego

a) The body is the innermost part of *the material Self* in each of us and certain parts of the body seem more intimately ours than the rest The clothes come next The old saying that the human person is composed of three parts—soul body and clothes—is more than a joke We so appropriate our clothes and iden

not steal from other thieves the gambler must pay his gambling-debts though he pay no other debts in the world The code of honor of fashionable society has throughout history been full of permissions as well as of vetoes the only reason for following either of which is that so we best serve one of our social selves. You must not lie in general but you may lie as much as you please if asked about your relations with a lady you must accept a challenge from an equal but if challenged by an inferior you may laugh him to scorn these are examples of what is meant.

c) By the Spiritual Self so far as it belongs to the Empirical Me I mean a man s inner or subjective bein his psychic faculties or dispositions taken con cretely not the bare principle of personal Unity or "pure Ego which remains still to be discussed These psychic dispositions are the most enduring and inti mate part of the self that which we most verily seem to be. We take a purer self satisfaction when we think of our ability to argue and discriminate of our moral sensibility and conscience of our indomitable will than when we survey any of our other possessions Only when these are altered is a man said to be *alienatus a se*

Now this spiritual self may be con dered in various ways We may divide it into faculties as just instanced isolating them one from another and identify ing ourselves with either in turn This is an *abst act* way of dealing with con sciousness in which as it actually presents itself a plurality of such faculties are always to be simultaneously found or we may insist on a concrete view and then the piritual self in us will be either the entire tream of our personal con sciousness or the present segment or section of that stream according as we take a broader or a narrower view—both the stream and the section being concrete existences in time and each bein a unity after its own peculiar kind But whether we take it abstractly or concretely our considering the spiritual self at all is a reflecti e process is the result of our abandoning the outward looking point of view and of our havin become able to think of subjectivity as such *to th nk oursel es as thinkers*

This attention to thought as such and the identification of ourselves with it rather than with any of the objects which it reveals, is a momentous and in some respects a rather mysterious operation, of which we need here only say that as a matter of fact t exists and that in everyone at an early age the distinction be tween thought as such and what it is of or about has become familiar to the mind The deeper grounds f h ibly be hard to

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who recogni e him and carry an image of him in their mind To wound any one of these his images is to wound him[1] But as the individuals who carry the images fall naturally into classes we may practically say that he has as many different social selves as there are distinct *groups* of persons about whose opinion he cares He generally shows a different side of himself to each of these different groups Many a youth who is demure enough before his parents and teachers swears and swaggers like a pirate among his tough young friends. We do not show ourselves to our children as to our club companions to our customers as to the laborers we employ to our own masters and employers as to our intimate friends From this there results what practically is a division of the man into several selves and this may be a discordant splitting as where one is afraid to let one set of his acquaintances know him as he is elsewhere or it may be a perfectly harmonious division of labor as where one tender to his children is stern to the soldiers or prisoners under his command

The most peculiar social self which one is apt to have is in the mind of the person one is in love with The good or bad fortunes of this self cause the most intense elation and dejection—unreasonable enough as measured by every other standard than that of the organic feeling of the individual To his own consciousness he *is* not so long as this particular social self fails to get recognition and when it is recognized his contentment passes all bounds

A man s *fame* good or bad and his *honor* or dishonor are names for one of his social selves The particular social self of a man called his honor is usually the result of one of those splittings of which we have spoken It is his image in the eyes of his own set which exalts or condemns him as he conforms or not to certain requirements that may not be made of one in another walk of life. Thus a layman may abandon a city infected with cholera but a priest or a doctor would think such an act incompatible with his honor A soldier s honor requires him to fight or to die under circumstances where another man can apologize or run away with no stain upon his social self A judge a statesman are in like manner debarred by the honor of their cloth from entering into pecuniary relations perfectly honorable to persons in private life Nothing is commoner than to hear people discriminate between their different selves of this sort As a man I pity you but as an official I must show you no mercy as a politician I regard him as an ally but as a moralist I loathe him etc etc What may be called club opinion is one of the very strongest forces in life[2] The thief must

[1] Who filches from me my good name etc

keeps them in reputation with their company little re ard the laws of G l or the ma istrate.

due from the la s of the commonwe lth they frequently flatter themsel es with the hope of impunity B t no m n escapes the punishment f *the r* c n ure d disl ke who offends a ainst the fash on and p n f the c mp ny he k ps a d w ld rec mm d hims lf to Nor is there one in t n thousan l ho is stiff and insensible e ugh to b r up und r the constant dislike nd condemnat n f his own club H mu t be of a stran e nd u ual constitution who can c tent h mself to live in co st nt disgrac and l sr p t with his wn particular soci ty Sol t de m ny men h ve so ht and b n rec ncil d to b t nobody that

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You must not lie in general but you may lie as much as y p eas ... about your relations with a lady you must accept a challenge from an equal but if challenged by an inferior you may laugh him to scorn these are examples of what is meant

c) By the Spiritual Self so far as it belongs to the Empirical Me I mean a man s inner or subjective being his psychic faculties or dispositions taken con cretely not the bare principle of personal Unity or pure Ego which remains still to be discussed These psychic dispositions are the most enduring and inti mate part of the self that which we most verily seem to be We take a purer self satisfaction when we think of our ability to argue and discriminate of our moral sensibility and conscience of our indomitable will than when we survey *any of our other possessions* Only when these are altered is a man said to be *alienat s a se*

Now this spiritual self may be considered in various ways We may divide it into faculties as just nstanced isolating them one from another and identify ing ourselves with either *in turn* *This is an abstract way of dealing with con* sciousness in which as it actually presents itself a plurality of such faculties are always to be s multaneously found or we may insist on a concrete view and then the piritual self in us will be e ther the entire stream of our personal con sciousness or the present segment or section of that stream according as we take a broader or a narrower view—both the stream and the section being co crete existences in time and each being a unity after its own peculiar kind But whether we take it abstractly or concretely our considering the spiritual self at all is a reflective process is the result of our abandoning the outward looking po nt of view and of our having become able to think of subjectivity as such *to th k o selves as thinkers*

This attention to thought as such and the identification of ourselves with it rather than with any of the objects which it re eals is a momentous and in some re pects a rather mysterious operation of which we need here only say that as a matte of fact it e ists and that in everyone at an early age the distinction be- tween th ught as such and what it is of or about has become *familiar to* the m d The deeper grounds for this discrimination may possibly be hard to find but superficial grounds are plenty and near at hand Almost anyone will tell us that thought is a different sort of existence from things because many so ts of thou ht are of no things—*e g* *pleasures* pains and emotions others are of non existent things—errors and fictions others again of existent things but in a form that is symbol c and does not resemble them—abstract ideas and ncepts whilst in the thou hts that do resemble the things they are of (per

ions (Lock *Ess y c. H ma Under to d* g bk ii, ch p xxviii, §)

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n s ems e sh ll f n l to govern themselves chiefly if not solely by this law of f shion and s they do that wh h keeps them in reputation w th their company little re ard the laws of God r the ma strate. Tl e pe lties that att nd the b e ch of Gods laws some nay m st men seld m se i ly reflect on and amongst those that do many whilst they bre k the laws ent rta n th ughts of future reconciliation and making their peace for such breaches nd as to the punishm nts due from the laws of the commo alth th y f quently flatte th msel es with th hope of impunity But no man scapes the puni hment of *the* censur and di l ke who ffends against the fashion a d op n of th c mpa y he k eps a d would rec mmend hims lf to Nor is there one in ten thousand who is st ff and i nsible e ough to b r up un ler the constant dislike and co d mnati n f hi wn club He m t be f t n e nd unu ual constitution who can cont nt h mself to li e in consta t disgrac nd d sr p te with l is wn particular soci ty Solit de many m n l sought and been rec cil d to b t nobody that

evil thereof Now let us try to settle for ourselves as definitely as we can just how this central nucleus of the Self may *feel* no matter whether it be a spiritual substance or only a delusive word

For this central part of the Self is felt It may be all that Transcendentalists say it is and all that Emp ricists say it is into the bar ain but it is at any rate no *mere* *ens rationis* cognized only in an intellectual way and no *mere* summation of memories or *mere* sound of a word in our ears It is *something* with which we also have direct sensible acquaintance and which is as fully present at any m n esent as in a whole lifetime of such
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accepted by those to whose introspection it may commend itself as true and confess ng my inab lity to meet the demands of others if others there be

First of all I am aware of a constant play of furtherances and hindrances in my thinkin of checks and r leases, tendencies which run with desire and tendencies which run the other way Amon the matters I think of some range them sel es n the s de of the thought s interests whilst others play an unfriendly part thereto The mutual inconsistencies and agreements reinforcements and obstructions which obtain amongst these objective matters reverberate backwards and produce what seem to be incessant reactions of my spontaneity upon them *welcoming or opposing appropriatin or disowning striving with or against* saying yes or no This palpitating inward life is in me that central nucleus which I just tried to desc ibe n terms that all men m ht use

But when I forsake such general descriptions and grapple with particulars coming to the closest poss ble qua ters with the facts *it s difficult for me to detect n the act vity any p ely spiritual element at all Whenever my ntrospective glance succeeds in turni g round quickly enough to catch one of these manif statio s of sponta eity in the act all t can ever feel distinctly is some bodily process for the most part taking place with n the head* Omitting for a moment what is bscure in these introspective results let me try to state those particu

desc be these mo ements quite exactly In attending to e ther an dea or a sensation bel ngin to a particular sense-sphere the movement is the adjustment

cepts sensations) we can feel alongside of the thing known the thought of it going on as an altogether separate act and operation in the mind

Now this subjective life of ours distinguished as such so clearly from the objects known by its means may as aforesaid be taken by us in a concrete or in an abstract way Of the concrete way I will say nothing just now except that the actual section of the stream will ere long in our discussion of the nature of the principle of *unity* in consciousness play a very important part The abstract way claims our attention first If the stream as a whole is identified with the Self far more than any outward thing a *certain portion of the stre m bstracted from the rest* is so identified in an altogether peculiar degree and is felt by all men as a sort of innermost centre within the circle of sanctuary within the citadel constituted by the subjective life as a whole Compared with this element of the stream the other parts even of the subjective life seem transient external possessions of which each in turn can be disowned whilst that which disowns them remains Now *what is this self of all the other selves?*

Probably all men would describe it in much the same way up to a certain point They would call it the *active* element in all consciousness saying that whatever qualities a man s feelings may possess or whatever content his thought may include there is a spiritual something in him which seems to *go out* to meet these qualities and contents whilst they seem to *come in* to be received by it It is what welcomes or rejects It presides over the perception of sensations and by giving or withholding its assent it influences the movements they tend to arouse It is the home of interest —not the pleasant or the painful not even pleasure or pain as such but that within us to which pleasure and pain the pleasant and the painful speak It is the source of effort and attention and the place from which appear to emanate the fiats of the will A physiologist who should reflect upon it in his own person could hardly help I should think connecting it more or less vaguely with the process by which ideas or incoming sensations are reflected or pass over into outward acts Not necessarily that it should *be* this process or the mere feeling of this process but that it should be in some close way *related* to this process for it plays a part analogous to it in the psychic life being a sort of junction at which sensory ideas terminate and from which motor ideas proceed and forming a kind of link between the two Being more incessantly there than any other single element of the mental life the other elements end by seeming to accrete round it and to belong to it It becomes opposed to them as the permanent is opposed to the changing and inconstant

One may I think without fear of being upset by any future Galtonian circulars believe that all men must single out from the rest of what they call themselves some central principle of which each would recognize the foregoing to be a fair general description —accurate enough at any rate to denote what is meant and keep it unconfused with other things The moment however they

it is nothing but a fiction the imaginary being denoted by the pronoun I and between these extremes of opinion all sorts of intermediaries would be found

Later we must ourselves discuss them all and sufficient to that day will be the

evil thereof Now let us try to settle for ourselves as definitely as we can just how this central nucleus of the Self may *feel* no matter whether it be a spiritual substance or only a delusive word

For this central part of the Self is felt It may be all that Transcendentalists say it is and all that Empiricists say it is into the bargain but it is at any rate no *mere ens rationis* cognized only in an intellectual way and no *mere* summation of memories or *mere* sound of a word in our ears It is something with which we also have direct sensible acquaintance and which is as fully present at any moment of consciousness in which it *is* present as in a whole lifetime of such moments When just now it was called an abstraction that did not mean that like some general notion it could not be presented in a particular experience It only meant that in the stream of consciousness it never was found all alone But when it is found it is *felt* just as the body is felt the feeling of which is also an abstraction because never is the body felt all alone but always together with other things *Now can we tell more precisely in what the feeling of this central active self consists* —not necessarily as yet what the active self [illegible] or principle but what we *feel* when we become aware of its [illegible]

[illegible]

[illegible]iduals) I had better continue in the [illegible] it may commend itself as true and accepted by those to whose introspection it may commend itself as true and confessing my inability to meet the demands of others if others there be

First of all I am aware of a constant play of furtherances and hindrances in my thinking of checks and releases tendencies which run with desire and tendencies which run the other way Among the matters I think of some range themselves on the side of the thought's interests whilst others play an unfriendly part thereto T[illegible] [illegible]cies and agreements reinforcements and obstructions w[illegible]

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lars which to my own

In the first place [illegible] are felt as movements of somet[illegible] [illegible] describe these movements quite exactly In attending to either an idea or a sensation belonging to a particular sense-sphere the movement is the adjustment of the sense-organ felt as it occurs I cannot think in visual terms, for example without feeling a fluctuating play of pressures convergences divergences and accommodations in my eyeballs The direction in which the object is conceived

to lie determines the character of these movements the feeling of which becomes for my consciousness identified with the manner in which I make myself ready to receive the visible thing My brain appears to me as if all shot across with lines of direction of which I have become conscious as my attention has shifted from one sense organ to another, in passing to successive outer things, or in following trains of varying sense-ideas

When I try to remember or reflect the movements in question instead of being directed towards the periphery seem to come from the periphery inwards and feel like a sort of *withdrawal* from the outer world As far as I can detect these feelings are due to an actual rolling outwards and upwards of the eyeballs

[illegible]

thought disposed at particular points thereof and the oscillations of my attention from one of them to another are most distinctly felt as alternations of direction in movements occurring inside the head [1]

In consenting and negating and in making a mental effort, the movements seem more complex and I find them harder to describe The opening and closing of the glottis play a great part in these operations and less distinctly the *movements of the soft palate etc shutting off the posterior nares* from the mouth My glottis is like a sensitive valve intercepting my breath instantaneously at every mental hesitation or felt aversion to the objects of my thought and as quickly opening to let the air pass through my throat and nose the *moment the repugnance is overcome The feeling of the movement of this air is* in me one strong ingredient of the feeling of assent The movements of the muscles of the brow and eyelids also respond very sensitively to every fluctuation in the agreeableness or disagreeableness of what comes before my mind

In *effort* of any sort contractions of the jaw muscles and of those of *respira*tion are added to those of the brow and glottis and thus the feeling passes out of the head properly so called It passes out of the head whenever the welcoming or rejecting of the object is *strongly* felt Then a set of feelings pour in from many bodily parts all expressive of my emotion and the head feelings proper are swallowed up in this larger mass

In a sense then it may be truly said that in one person at least *the Self of selves when carefully examined is found to consist mainly of the collection of these peculiar motions in the head or between the head and throat* I do not for a moment say that this is *all* it consists of for I fully realize how desperately hard is introspection in this field But I feel quite sure that these cephalic motions are the portions of my innermost activity of which I am *most distinctly aware* If the dim portions which I cannot yet define should prove to be like unto these distinct portions in me and I like other men *it would follow that our entire feeling of spiritual activity or what commonly passes by that name is really a feeling of bodily activities whose exact nature is by most men overlooked*

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[1] For some further remarks on these feelings of movement see the next chapter

overt acts would be a collection of activities physiologically in no essential way different from the overt acts themselves. If we divide all possible physiological acts into *adjustments* and *executions*, the nuclear self would be the adjustments collectively considered; and the less intimate, more shifting self, so far as it was active, would be the executions. But both adjustments and executions would obey the reflex type. Both would be the result of sensorial and ideational processes discharging either into each other within the brain, or into muscles and other parts outside. The peculiarity of the adjustments would be that they are minimal reflexes, few in number, incessantly repeated, constant amid great fluctuations in the rest of the mind's content, and entirely unimportant and uninteresting except through their uses in furthering or inhibiting the presence of various things and actions before consciousness. These characters would naturally keep us from introspectively paying much attention to them in detail, whilst they would at the same time make us aware of them as a coherent group of processes, strongly contrasted with all the other things consciousness contained,—even with the other constituents of the 'Self,' material, social, or spiritual, as the case might be. They are reactions, and they are *primary* reactions. Everything arouses them; for objects which have no other effects will for a moment contract the brow and make the glottis close. It is as if all that visited the mind had to stand an entrance-examination, and just show its face so as to be either approved or sent back. These primary reactions are like the opening or the closing of the door. In the midst of psychic change they are the permanent core of turnings-towards and turnings-from, of yieldings and arrests, which naturally seem central and interior in comparison with the foreign matters, *apropos* to which they occur, and hold a sort of arbitrating, decisive position, quite unlike that held by any of the other constituents of the Me. It would not be surprising, then, if we were to feel them as the birthplace of conclusions and the starting point of acts, or if they came to appear as what we called a while back 'the sanctuary within the citadel' of our personal life.*

* Wundt's account of Self-consciousness deserves to be compared with this. What I have called adjustments he calls processes of Apperception. "In this development [of consciousness] one particular group of percepts claims a preëminent significance, namely, those of which the springs lie in ourselves. The images of feelings we get from our own body, and the representations of our own movements distinguish themselves from all others by forming a *permanent group*. As there are always some muscles in a state either of tension or of activity, it follows that we never lack a sense, either dim or clear, of the positions or movements of our body. . . . This permanent sense, moreover, has this peculiarity, that we are aware of our power at any moment voluntarily to arouse any one of its ingredients. We excite the sensations of movement immediately by such impulses of the will as shall arouse the movements themselves; and we excite the visual and tactile feelings of our body by the voluntary movement of our organs of sense. So we come to conceive this permanent mass of feeling as immediately or remotely subject to our will, and call it the *consciousness of ourself*. This self-consciousness is, at the outset, thoroughly sensational, . . . only gradually the second-named of its characters, its subjection to our will, attains predominance. In proportion as the apperception of all our mental objects appears to us as an inward exercise of our will, does our self-consciousness begin both to widen itself and to narrow itself at the same time. It widens itself in that every mental act whatever comes to stand in relation to our will; and it narrows itself in that it concentrates itself more and more upon the inner activity of apperception, over against which our own body and all the representations connected with it appear as external objects, different from our proper self. This consciousness, contracted down to the process of apperception, we call our Ego; and the apperception of mental objects in general, may thus, after Leibnitz, be designated as the raising of them into our

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Now without pledging ourselves in any way to adopt this hypothesis let us dally with it for a while to see to what consequences it might lead if it were true.

In the first place the nuclear part of the Self intermediary between ideas and

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y the *ultimate* one of all the selves it would follow that *all* that is ex

p c ccu is, strictly considered *objective* that this Objective falls asunder into two contrasted parts one realized as Self the other as not Self and that over and above these parts there is nothing save the fact that they are known the fact of the stream of thought being there as the indispens ll ob jective condition of th

y known in subsequent reflection Instead then of the stream of thought being one of *con*-sciousness thinking its own existence along with whatever else it thinks (as Ferrier says) it might be better called a stream of *Sciousness* pure and simple thinking objects of some of which it makes what it calls a Me and only aware of its pure S lf

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and its not me as objects which work out their drama together but not yet in cluding or contemplating its own subjective being The sciousness in question would be the *Thinker* and the existence of this thinker would be given to us rather as a logical postulate than as that direct inner perception of spiritual ac tivity which we naturally believe ourselves to have Matter ' as something be hind physical phenomena is a postulate of this sort Between the postulated Matter and the postulated Thinker the sheet of phenomena would then swing some of them (the realities) pertaining more to the matter others (the fic tions opinions and errors) pertaining more to the Thinker But *who* the Thinker would be or how many distinct Thinkers we ought to suppose in the universe would all be subjects for an ulterior metaphysical inquiry

Speculations like this traverse common sense and not only do they traverse common sense (which in philosophy is no insuperable objection) but they con tradict the fundamental assumption of *every* philosophic school Spiritualists transcendentalists and empiricists alike admit in us a continual direct percep tion of the thinking activity in the concrete However they may otherwise dis agree they vie with each other in the cordiality of their recognition of our *thoughts* as the one sort of existent which skepticism cannot touch [1] I will there fore treat the last few pages as a parenthetical digression and from now to the end of the volume revert to the path of common sense again I mean by this that

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self-consciousness Thus the natural development of self-consciousness implicitly involves the most abstract forms in which this faculty has been described in philosophy only philoso phy is fond of placing the abstract e o at th

n those ims If pr cess [what ologe

1 The only exception I know of is M J Sourau in his importa t article in the *R vue philosophique* vol XXII, p 449 M Sourau s conclusion is that *la co sc ce n existe pas* (p 472)

I will continue to assume (as I have assumed all along especially in the last chapter) a direct awareness of the process of our thinking as such simply insisting on the fact that it is an even more inward and subtle phenomenon than most of us suppose At the conclusion of the volume however I may permit myself to revert again to the doubts here provisionally mooted and will indulge in some metaphysical reflections suggested by them

At present then the only conclusion I come to is the following That (in some persons at least) the part of the innermost Self which is most vividly felt turns out to consist for the most part of a collection of cephalic movements of adjustments which for want of attention and reflection usually fail to be perceived and classed as what they are that over and above these there is an obscurer feeling of something more but whether it be of fainter physiological processes or of nothing objective at all but rather of subjectivity as such of thought become its own object must at present remain an open question — like the question whether it be an indivisible active soul substance or the question whether it be a personification of the pronoun I or any other of the guesses as to what its nature may be

Farther than this we cannot as yet go clearly in our analysis of the Self s constituents So let us proceed to the emotions of Self which they arouse

Self Feeling

[illegible]

vai glory on the one hand and on the other modesty humi ty [illegible] fidence shame mortification contrit on the sense of obloquy and personal de pa r These two opposite classes of affection seem to be direct and elementary endowments of our nature Associationists would have it that they are on the other hand secondary phenomena arising from a rapid computation of the sen s ble pleasure [illegible] which our prosperous or debased personal predicament is likely [illegible]
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of shame No dou [illegible]
sible rewards for our desert and when in a fit of self despair we forebode evil But the mere expectation of reward *is* not the self satisfaction and the mere apprehension of the evil *is* not the self-despair for there is a certain ave age tone of self feeling which each one of us carries about with him and which is independent of the objective reasons we may have for satisfaction or discontent That is a very meanly-conditioned man may abound in unfaltering conce t, and one whose success in life is secure and who is esteemed by all may remain diffident of his powers to the end.

One may say however that the normal *provocat ve* of self feeling is one s actual s ccess or failure and the good or bad actual position one holds in the w rld He put in his thumb and pulled out a plum and said what a good boy am I A man with a broadly extended empirical Ego with powers that have unif rmly brought him success with place and wealth and friends and fame is

not likely to be visited by the morbid diffidences and doubts about himself which he had when he was a boy Is not this great Babylon which I have planted? [1] Whereas he who has made one blunder after another, and still lies in middle life among the failures at the foot of the hill is liable to grow all sicklied o er with self distrust and to shrink from trials with which his powers can really cope

The emotions themselves of self satisfaction and abasement are of a unique sort each as worthy to be classed as a primitive emotional species as are for example rage or pain Each has its own peculiar physiognomical expression In self satisfaction the extensor muscles are innervated the eye is strong and glorious the gait rolling and elastic the nostril dilated and a peculiar smile plays upon the lips This whole complex of symptoms is seen in an exquisite way in lunatic asylums which always contain some patients who are literally mad with conceit and whose fatuous expression and absurdly strutting or swaggering gait is in tragic contrast with their lack of any valuable personal quality It is in these same castles of despair that we find the strongest examples of the opposite physiognomy in good people who think they have committed the unpardonable sin and are lost forever who crouch and cringe and slink from notice and are unable to speak aloud or look us in the eye Like fear and like anger in similar morbid conditions these opposite feelings of Self may be aroused with no adequate exciting cause And in fact we ourselves know how the barometer of our self esteem and confidence rises and falls from one day to another through causes that seem to be visceral and organic rather than rational and which certainly answer to no corresponding variations in the esteem in which we are held by our friends Of the origin of these emotions in the race we can speak better when we have treated of—

Self Seeking and Self Preservation

These words cover a large number of our fundamental instinctive impulses We have those of *bodily self seeking* those of *social self seeking* and those of *spiritual self seeking*

All the ordinary useful reflex actions and movements of alimentation and defence are acts of bodily self preservation Fear and anger prompt to acts that are useful in the same way Whilst if by self seeking we mean the providing for the future as distinguished from maintaining the present we must class both anger and fear with the hunting the acquisitive the home constructing and the tool constructing instincts as impulses to self seeking of the bodily kind Really however these latter instincts with amativeness parental fondness curiosity and emulation seek not only the development of the bodily Self but that of the material Self in the widest possible sense of the word

Our *social self seeking* in turn is carried on directly through our amativeness and friendliness our desire to please and attract notice and admiration our emulation and jealousy our love of glory influence and power and indirectly through whichever of the material self seeking impulses prove serviceable as means to social ends That the direct social self seeking impulses are probably

[1] See the excellent remarks by Prof Bain on the Emotion of Po er in *The Emotions and the Will*

pure instincts is easily seen The noteworthy thing about the desire to be recognized by others is that its strength has so little to do with the worth of the recognition computed in sensational or rational terms We are crazy to get a visiting list which shall be large to be able to say when any one is mentioned Oh! I know him well and to be bowed to in the street by half the people we meet. Of course distinguished friends and admiring recognition are the most desirable Th h ray somewhere asks his readers to confess whether it would not give walking down Pall Mall with a

passion is to keep their names in the

arrivals and departures personal paragraphs, interviews —gossip even scandal will suit them if nothing better is to be had Guiteau Garfield s assas s an example of the extremity to which this sort of craving for the notoriety T pers bounded his mental hori

thee O Lord

Not only the people but the places and things I know enlarge my Self in a sort of metaphoric social way *Ca me connait* as the French workman says of the implement he can use well So that it comes about that persons for whose *opin on* we care nothing are nevertheless persons whose notice we woo and that many a man truly great many a woman truly fastidious in most respects will take a deal of trouble to dazzle some insignificant cad whose whole personality they heartily despise

Under the head of *spiritual self seeking* ought to be included every impulse towards psychic progress whether intellectual moral or spiritual in the narrow sense of the term It must be admitted however that much that commonly passes fo spiritual self-seeking in this narrow sense is only material and social self seeking beyond the gra e In the Mohammedan desire for paradise and the Christian aspiration not to be damned in hell the materiality of the goods sou ht is undisguised In the more positi e and refined view of heaven many of its goods the fellowship of the saints and of our dead ones and the presence of God are but social goods of the most exalted kind It is only the search of the redeemed inward nature the spotlessness from in whether here or hereafter that can count as spiritual self seeking pure and undefiled

But this broad external review of the facts of the life of the Self will be incomplete without some account of the

Ri alry and Conflict of the Different Sel es

W th most objects of desire physical nature restricts our choice to but one of man epresented goods and e en so it is here. I am often confronted by the ne ess ty of standing b one of my empirical sel es and relinquishin the rest Not that I would n t if I could be both handsome and fat and well dressed and a gre t thlete and make a million a year be a wit a *bo a t* and a lady killer as well as a philosopher a philanthropist statesman warrior and Afri

can explorer, as well as a "tone-poet" and saint. But the thing is simply impossible. The millionaire's work would run counter to the saint's; the *bon-vivant* and the philanthropist would trip each other up; the philosopher and the lady-killer could not well keep house in the same tenement of clay. Such different characters may conceivably at the outset of life be alike *possible* to a man. But to make any one of them actual, the rest must more or less be suppressed. So the seeker of his truest, strongest, deepest self must review the list carefully, and pick out the one on which to stake his salvation. All other selves thereupon become unreal, but the fortunes of this self are real. Its failures are real failures, its triumphs real triumphs, carrying shame and gladness with them. This is as strong an example as there is of that selective industry of the mind on which I insisted some pages back (p. 184 ff.). Our thought, incessantly deciding, among many things of a kind, which ones for it shall be realities, here chooses one of many possible selves or characters, and forthwith reckons it no shame to fail in any of those not adopted expressly as its own.

I, who for the time have staked my all on being a psychologist, am mortified if others know much more psychology than I. But I am contented to wallow in the grossest ignorance of Greek. My deficiencies there give me no sense of personal humiliation at all. Had I "pretensions" to be a linguist, it would have been just the reverse. So we have the paradox of a man shamed to death because he is only the second pugilist or the second oarsman in the world. That he is able to beat the whole population of the globe minus one is nothing; he has "pitted" himself to beat that one; and as long as he doesn't do that nothing else counts. He is to his own regard as if he were not, indeed he *is* not.

Yonder puny fellow, however, whom every one can beat, suffers no chagrin about it, for he has long ago abandoned the attempt to "carry that line," as the merchants say, of self at all. With no attempt there can be no failure; with no failure no humiliation. So our self-feeling in this world depends entirely on what we *back* ourselves to be and do. It is determined by the ratio of our actualities to our supposed potentialities; a fraction of which our pretensions are the denominator and the numerator our success: thus, $\text{Self-esteem} = \frac{\text{Success}}{\text{Pretensions}}$. Such a fraction may be increased as well by diminishing the denominator as by increasing the numerator.[1] To give up pretensions is as blessed a relief as to get them gratified; and where disappointment is incessant and the struggle unending, this is what men will always do. The history of evangelical theology, with its conviction of sin, its self-despair, and its abandonment of salvation by works, is the deepest of possible examples, but we meet others in every walk of life. There is the strangest lightness about the heart when one's nothingness in a particular line is once accepted in good faith. *All* is not bitterness in the lot of the lover sent away by the final inexorable 'No.' Many Bostonians, *crede experto* (and inhabitants of other cities, too, I fear), would be happier women and men to-day, if they could once for all abandon the notion of keeping up a Musical Self,

[1] *Cf.* Carlyle: *Sartor Resartus*, 'The Everlasting Yea.' "I tell thee, blockhead, it all comes of thy vanity; of what thou fanciest those same deserts of thine to be. Fancy that thou
desc ... fancy
that ... What
act of ... dst no

and without shame let people hear them call a symphony a nuisance How pleasant is the day when we give up striving to be young —or slender! Thank God! we say *those* illusions are gone Everything added to the Self is a burden as well as a pride A certain man who lost every penny during our Civil War went and actually rolled in the dust saying he had not felt so free and happy since he was born.

Once more then our self feeling is in our power As Carlyle says Make thy claim of wages a zero then hast thou the world under thy feet Well did the wisest of our time write it is only with *renunciation* that life properly speaking can be said to begin

Neither threats nor pleadings can move a man unless they touch some one of his potential or actual selves Only thus can we as a rule get a purchase on another s will The first care of diplomatists and monarchs and all who wish to rule or influence is accordingly to find out their victim s strongest principle of self regard so as to make that the fulcrum of all appeals But if a man has given [illegible] fate and ceased to regard them as [illegible]

own power —then fortune s shocks [illegible]

us by thus narrowing and at the same time solidifying our Self to make it invul[illegible] [illegible] too? I will speak what ap[illegible]

[illegible] it is yours to kill and mine to die intr[illegible]

[illegible] e? We choose the pilot the sailors the [illegible]

must likew se d e

This Stoic fashion though efficacious and heroic enough in its place and time s it must be confessed only possible as an habitual mood of the soul to narrow and unsympathetic characters It proceeds altogether by exclus on If I am a Stoic the goods I cannot appropriate cease to be *my* goods and the temptation l es very near t[illegible] e good at all We find this mode of protecting the Self by e[illegible]

respects n t St[illegible]

the reg on of what they cannot se[illegible]

them or who treat them with ind fference people over whom they gain no influ nce are people on whose existence however meritorious it may intrinsically be they look w th ch ll negat n if not w th pos t ve hate Who will not be mine I w ll exclude from exi tence altogethe that is as far as I can make it so such people shall be as if they were not Thus may a certain absoluteness and definiteness in the outline of my Me console me for the smallness of its content

T W Higginso translat (866) p

"The usual mode [illegible] lessening th[illegible] hock [illegible] disappointm[illegible] t disesteem is t[illegible] tra[illegible] t [illegible] if possible low estimat[illegible] [illegible] th persons th[illegible] t i flict t This is o[illegible] m dy f[illegible] th[illegible] t[illegible] sures [illegible] party spirit, as ell as [illegible] personal malignity (Bain *Th Em[illegible] ns nd th Will* p. [illegible])

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[illegible] onder puny fellow however whom every one can beat suffers no chagrin about it for he has long ago abandoned the attempt to carry that line as the merchants say of self at all With no attempt there can be no failure with no failure no humiliation So our self feeling in this world depends entirely on what we *back* ourselves to be and do It is determined by the ratio of our actualities to our supposed potentialities a fraction of which our pretensions are the denominator and the numerator our success thus Self esteem$=\frac{\text{Success}}{\text{Pretensions}}$ Such a fraction may be increased as well by diminishing the denominator as by increasing the numerator [1] To give up pretensions is as blessed a relief as to get them gratified and where disappointment is incessant and the struggle unending this is what men will always do The history of evangelical theology with its conviction of sin its self despair and its abandonment of salvation by works is the deepest of possible examples but we meet others in every walk of life There is the strangest lightness about the heart when one s nothingness in a particular line is once accepted in good faith *All* is not bitterness in the lot of the lover sent away by the final inexorable No Many Bostonians *crede experto* (and inhabitants of other cities too I fear) would be happier women and men to-day if they could once for all abandon the notion of keeping up a Musical Self

[1] *Cf* Carlyle *Sartor Resartus* The Everlasting Yea I tell thee blockhead it all comes of thy vanity of what thou fanciest those same deserts of thine to be Fancy that thou deservest to be hanged (as is most likely) thou wilt feel it happiness to be only shot fancy that thou deservest to be hanged in a hair halter it will be a luxury to die in hemp What act of legislature was there that *thou* shouldst be happy? A little while ago thou hadst no right to *be* at all etc etc.

But too much sensuality is despised or at best condoned on account of the other qualities of the indi idual The wider material selves are regarded as higher than the immediate body He is esteemed a poor creature who is unable to fore- l i it meat and drink and warmth and sleep for the sake of getting on in h her than the material self

rather than lose it a man ought to be willing
and p operty and life itself

In each kind of self material social and spiritual men distin uish between the immediate and actual a d the remote and potential between the narrower and the wider view to the detriment of the former and advantage of the latter One must forego a present bodily enjoyment for the sake of one s general health one must abandon the dollar in the hand for the sake of the hundred dollars to come one must make an enemy of his present interlocutor if thereby one makes friends of a more valued circle one must go without learning and grace and w t the better to compass one s soul s salvation

Of all these w der more potential selves *the potential social self* is the most inte estin by reason of certain apparent paradoxes to which it leads in con ct on with our moral and religious life When

cial self by
whose erc
appealing to their decision may be very remote it may be represented as bare y poss ble I may not hope for its realization during my lifetime I may even ex pect the future generations which would approve me if they knew me to know m wh n I am dead and gone Yet still the emotion that beckons

permanent Me wh ch I seek This judge is God the Absolute Mind the G eat C mp n n We hear in these days of scientific enlightenment a great deal of

pray g It seems probable that in p te of all that science may do to the con trary men will continue to pray to the end of time unless their mental nature hanges n a manner which nothing we know should lead us to expect The im p lse to p ay is a necessary consequence of the fact that whilst the innermost

pertinence what was f rmed is bstinacy what was fidelity is w fanaticism Th deal jud lone I now believe, can ad my qualities my willingnesses my powers, for what they truly are. My fell ws, misled by interest and pr judice, ha e gone astr y

Sympathetic people on the contrary proceed by the entirely opposite way of expansion and inclusion The outline of their self often gets uncertain enough but for this the spread of its content more than atones *Nil humani a me alienum* Let them despise this little person of mine and treat me like a dog *I* shall not negate *them* so long as I have a soul in my body They are realities as much as I am What positive good is in them shall be mine too etc etc The magnanimity of these expansive natures is often touching indeed Such persons can feel a sort of delicate rapture in thinking that however sick ill favored mean conditioned and generally forsaken they may be they yet are integral parts of the whole of this brave world have a fellow s share in the strength of the dray horses the happiness of the young people the wisdom of the wise ones and are not altogether without part or lot in the good fortunes of the Vanderbilts and the Hohenzollerns themselves Thus either by negating or by embracing the Ego may seek to establish itself in reality He who with Marcus Aurelius can truly say O Universe I wish all that thou wishest has a self from which every trace of negativeness and obstructiveness has been removed—no wind can blow except to fill its sails

A tolerably unanimous opinion ranges the different selves of which a man may be seized and possessed and the consequent different orders of his self regard in an *hierarchical scale with the bodily Self at the bottom the spiritual Self at top and the extracorporeal material selves and the various social selves between* Our merely natural self seeking would lead us to aggrandize all these selves we give up deliberately only those among them which we find we cannot keep Our unselfishness is thus apt to be a virtue of necessity and it is not without all show of reason that cynics quote the fable of the fox and the grapes in describing our progress therein But this is the moral education of the race and if we agree in the result that on the whole the selves we can keep are the intrinsically best we need not complain of being led to the knowledge of their superior worth in such a tortuous way

Of course this is not the only way in which we learn to subordinate our lower selves to our higher A direct ethical judgment unquestionably also plays its part and last not least we apply to our own persons judgments originally called forth by the acts of others It is one of the strangest laws of our nature that many things which we are well satisfied with in ourselves disgust us when seen in others With another man s bodily hoggishness hardly anyone has any sympathy —almost as little with his cupidity his social vanity and eagerness his jealousy his despotism and his pride Left absolutely to myself I should probably allow all these spontaneous tendencies to luxuriate in me unchecked and it would be long before I formed a distinct notion of the order of their subordination But having constantly to pass judgment on my associates I come ere long to see as Herr Horwicz says my own lusts in the mirror of the lusts of others and to *think* about them in a very different way from that in which I simply *feel* Of course the moral generalities which from childhood have been instilled into me accelerate enormously the advent of this reflective judgment on myself

So it comes to pass that as aforesaid men have arranged the various selves which they may seek in an hierarchical scale according to their worth A certain amount of bodily selfishness is required as a basis for all the other selves.

the interests of other selves than his own. Now what is the intimate *nature* of the selfish emotion in him and what is the primary *object* of its regard? We have described him pursuing and fostering as his self first one set of things and then another; we have seen the same set of facts gain or lose interest in his eyes, leave him indifferent, or fill him either with triumph or despair according as he made pretensions to appropriate them, treated them as if they were potentially or actually parts of himself, or not. We know how little it matters to us whether some man, a man taken at large and in the abstract, prove a failure or succeed in life,—he may be hanged for aught we care,—but we know the utter momentousness and terribleness of the alternative when the man is the one whose name we ourselves bear. *I* must not be a failure, is the very loudest of the voices that clamor in each of our breasts: let fail who may, *I* at least must succeed. Now the first conclusion which these facts suggest is that each of us is animated by a *direct feeling of regard for his own pure principle of individual existence*, whatever that may be, taken merely as such. It appears as if all our concrete manifestations of selfishness might be the conclusions of as many syllogisms, each with this principle as the subject of its major premiss, thus: Whatever is me is precious; this is me; therefore this is precious; whatever is mine must not fail; this is mine; therefore this must not fail, etc. It appears, I say, as if this principle inoculated all it touched with its own intimate quality of worth; as if, previous to the touching, everything might be matter of indifference, and nothing interesting in its own right; as if my regard for my own body even were an interest not simply in this body, but in this body only so far as it is mine.

But what is this abstract numerical principle of identity, this "Number One" within me, for which, according to proverbial philosophy, I am supposed to keep so constant a lookout? Is it the inner nucleus of my spiritual self, that collection of obscurely felt 'adjustments,' *plus* perhaps that still more obscurely perceived subjectivity as such, of which we recently spoke? Or is it perhaps the concrete stream of my thought in its entirety, or some one section of the same? Or may it be the indivisible Soul-Substance, in which, according to the orthodox tradition, my faculties inhere? Or, finally, can it be the mere pronoun I? Surely it is none of these things, that self for which I feel such hot regard. Though all of them together were put within me, I should still be cold, and fail to exhibit anything worthy of the name of selfishness or of devotion to

that all the facts of rivalry and substitution that have so struck us, all the shiftings and expansions and contractions of the sphere of what shall be considered me and mine, are but results of the fact that certain *things* appeal to primitive and instinctive impulses of our nature, and that we follow their destinies with an excitement that owes nothing to a reflective source. These objects our con-

pass f[illegible] disinterested man. If it be the 'other-worldly' self which he seeks, and if he seeks it ascetically,—even though he would rather see all mankind damned eternally than lose his individual soul—'saintliness' will probably be the name by which his selfishness will be called.

of the empirical selves of a man is a Self of the *social* sort it yet can find its only adequate *Socius* in an ideal world

All progress in the social Self is the substitution of higher tribunals for lower this ideal tribunal is the highest and most men either continually or occasion ally carry a reference to it in their breast The humblest outcast on this earth can feel himself to be real and valid by means of this higher recognition And on the other hand for most of us a world with no such inner refuge when the outer social self failed and dropped from us would be the abyss of horror I say for most of us because it is probable that individuals differ a good deal in the degree in which they are haunted by this sense of an ideal spectator It is a much more essential part of the consciousness of some men than of others Those who have the most of it are possibly the most *religious* men But I am sure that even those who say they are altogether without it deceive themselves and really have it in some degree Only a non gregarious animal could be com pletely without it Probably no one can make sacrifices for right without to some degree personifying the principle of right for which the sacrifice is made and expecting thanks from it *Complete* social unselfishness in other words can hardly exist *complete* social suicide hardly occur to a man s mind Even such texts as Job s Though He slay me yet will I trust Him or Marcus Aurelius s If gods hate me and my children there is a reason for it can least of all be cited to prove the contrary For beyond all doubt Job revelled in the thought of Jehovah s recognition of the worship after the slaying should have been done and the Roman emperor felt sure the Absolute Reason would not be all indif ferent to his acquiescence in the gods dislike The old test of piety Are you willing to be damned for the glory of God? was probably never answered in the affirmative except by those who felt sure in their heart of hearts that God would credit them with their willingness and set more store by them thus than if in His unfathomable scheme He had not damned them at all

All this about the impossibility of suicide is said on the supposition of *positive* motives When possessed by the emotion of *fear* however we are in a *negative* state of mind that is our desire is limited to the mere banishing of something without regard to what shall take its place In this state of mind there can un questionably be genuine thoughts and genuine acts of suicide spiritual and social as well as bodily Anything *anything* at such times so as to escape and not to be! But such conditions of suicidal frenzy are pathological in their nature and run dead against everything that is regular in the life of the Self in man

What Self Is Loved in Self Love"?

We must now try to interpret the facts of self love and self seeking a little more delicately from within

A man in whom self seeking of any sort is largely developed is said to be selfish [1] He is on the other hand called unselfish if he shows consideration for

[1] The *k na* of selfishness varies with the self that is sought If t be the mere bodily self for no self in subor dinate himself to others as the best means to his end and in this case he is very apt to

1

together in other bodies than his o ... his acts suicidal still he would need a principle of *consciousness* just as ... his acts suicidal still he would need a principle of his bodily *selfishness* any now Such a principle cannot then be the principle of his bodily *selfishness* any more than it is the principle of any other tendency he may show

So much for the bodily self lo e But my *social* self love my interest in the images other men have framed of me is also an interest in a set of objects ex ternal to my thought These thoughts in other men s minds are out of my mind and ejective to me They come and go and grow and dwindle and I am puffed up with pride or blush with shame at the result just as at my success or failure in the pursuit of a material thing So that here again just as in the former case the pure principle seems out of the game as an *object* of regard and pres ent only as the general form or condition under which the regard and the think in go on in me at all

But, it will immediately be objected this is giving a mutilated account of the facts. Those ima es of me in the minds of other men are it is true things outside of me whose changes I perceive just as I perceive any other outward change But the pride and shame which I feel are not concerned merely with *those* chan es I feel as if something else had changed too when I perceive my image in your mind to ha e changed for the w rse something in me to which that image belo gs and which a moment ago lusty but now weak contracted and c change I feel the shame about? Is not t the proper object of my egoistic concern ... all my pu e Ego my bare numer cal principle of distinction from other men and no empir cal ... ll?

... t is no suc my historic Me n your mind b spectful greeting from yo ... being a bare I that I claim it it is as being an I who has always been treated w th respect who belongs to a certain family and set who has certain powers possessions and public functions sens bilities duties and purposes and mer ts and deserts All this is what your disdain negates and contradicts this is the thing ins de of me whose changed treatment I feel the shame about this is what was lusty and now in consequence of your conduct is collap ed and this certainly is an empirical objecti e thing Indeed the thing that is felt modi fied and chan ed for the worse during my feeling of shame is often more con crete even than this—it is simply my bodily person in which your conduct immediately and without any reflection at all on my part works those muscular glandular and vascular chan es which together make up the expression of shame In this instinctive reflex sort of shame the body is just as much the ent e hicle of the self feeling as in the coarser cases which we first took up t was the eh cle of the self-seekin As in simple hoggishness a succulent morsel ... the reflex mechanism to behavior which the bystanders f

sciousness treats as the primordial constituents of its Me Whatever other objects whether by association with the fate of these or in any other way come to be followed with the same sort of interest form our remoter and more secondary self *The words* ME *then and* SELF *so far as they arouse feeling and connote emotional worth are* OBJECTIVE *designations meaning* ALL THE THINGS *which have the power to produce in a stream of consciousness ment of a certain peculia* [illegible]

pa [illegible] at selfishness relates Now I say that he identifies himself with this body because he loves *it* and that he does not love it because he finds it to be identified with himself Reverting to [illegible] psychology will help us to [illegible]

[illegible] n connate as acquired Our *interest in things* means the attention and emotion which the thought of them will excite and the actions which their presence will evoke Thus every species is particularly interested in its own prey or food its own enemies its own sexual mates and its own young These things fascinate by their intrinsic power to do so they are cared for for their own sakes

Well it stands not in the least otherwise with our bodies They too are percepts in our objective field—they are simply the most interesting percepts there What happens to them excites in us emotions and tendencies to action more energetic and habitual than any which are excited by other portions of the field What my comrades call my bodily selfishness or self love is nothing but the sum of all the outer acts which this interest in my body spontaneously draws from me My selfishness is here but a descriptive name for grouping together the outward symptoms which I show Wh [illegible] to keep my seat wh [illegible] y neighbor what I [illegible] I grab I love them [illegible] as the mother loves her babe or a generous man an heroic deed Wherever as here self seeking is the outcome of simple instinctive propensity it is but a name for certain reflex acts Something rivets my attention fatally and fatally provokes the selfish response Could an automaton be so skilfully constructed as to ape these acts it would be called selfish as properly as I It is true that I am no automaton but a thinker But my thoughts like my acts are here concerned only with th [illegible]

[illegible] the more devoid of any inward looking glance A baby whose consciousness of the pure Ego of himself as a thinker is not usually supposed developed is in this way as some German has said *der vollendeteste Egoist* His corporeal person and what ministers to its needs are the only self he can possibly be said to love His so called self love is but a name for his insensibility to all but this one set of things It may be that he needs a pure principle of subjectivity a soul or pure Ego (he certainly needs a stream of thought) to make him sensible at all to anything to make him discriminate and love *uberhaupt* —how that may be we shall see ere long but this pure Ego which would then be the *condition* of his loving need no more be the *ob*

My spiritual powers again must interest me more than those of other people and for the same reason. I should not be here at all unless I had cultivated them and kep[illegible] from decay And the same law which made me once care for them [illegible]

My [illegible]

[illegible]

interest [illegible] through associati[illegible] as means or as habitual concomitants *and so in a thous nd ways the primitive [illegible] here of the egoist c emotions may enlarge* and chan e its boundaries

This sort of interest is really the *mea ng of the word* my Whatever has it is *co[illegible] so* a part of me. My child my friend dies, and where he goes I feel that part of myself now is and evermore shall be

> *For this los[illegible] g is true dy ng*
> *This is lordly m[illegible]'s do[illegible]*
> *This his slow but sure r[illegible]*
> *Star by star his world r[illegible]*

The fact remains however that certain special sorts of thing tend primordi all to possess this interest and form the *natural* me But all these things are *object* properly so called to the subject which does the thinking And this latter fact upsets at once the d ctum of the old-fashioned sensationalist psy chology that altruistic pass ons and interests are contradictory to the nature of thin s and that f they appear anywhere to exist it must be as secondary prod [illegible] [illegible] elfishness taught by experience a hypo-

[illegible]

n t w th the interests of the me The phenomenon o[illegible] [illegible] l essence the same, whatever be the target upon which it is discharged and what the target actually happens to be is solely a question of fact. I might conceiv ably be as much fascinated and as primitively so by the care of my neighbor s body as by the care of my own. The only check to such exuberant altruistic interests is natural selection which would weed out such as were very harmful t the ind vidual o to his tribe Many such interests, however remain un-weeded out—the inte est in the oppos te sex for example which seems in mank d stron er than is called for b its utilitarian need and alongside of them emain inte e t like that in alcoholic intoxication or in musical sounds wh ch fo[illegible] ht we can see are with ut any utility whatever The sympathetic instincts and the egoistic ones are thus co-ordinate The arise so far as we can tell, on the same psychologic level The only difference between them is that the instincts called egoistic form much the larger mass.

The onl author whom I know to have discussed the question whether the pure Ego *per se* can be an object of regard is Herr Horwicz, in his ex tremely able and acute *Psychologische A[illegible]lysen*. He too says that all self re-gard is regard for certain objects e things. He disposes so well of one kind of objection that I must conclude by quoting a part of his own words

Lotze *M d. Psych* pp. 4[illegible]8–5[illegible] *Microcosmo* bk. ii, chap. v §§ 3, 4.

they consider due to another kind of self regard But in both cases there may be no particular self *regarded* at all by the mind and the name self regard may be only a descriptive title imposed from without the reflex acts themselves and the feelings that immediately result from their discharge

After the bodily and social selves come the spiritual But which of my spir itual selves do I really care for? My Soul substance? my transcendental Ego or Thinker ? my pronoun I? my subjectivity as such? my nucleus of cephalic adjustments? or my more ph nomenal and perishable powers my loves and es and the like? Surely the latter But they ternal and objec tive et and so stands the p u but being there is not itn being loved itself

To sum up then *we see no reason to suppose that self love is primarily or secondarily or ever love for one s mere principle of conscious identity* It is always love for something which as compared with that principle is superficial transient liable to be taken up or dropped at will

And zoological psychology again comes to the aid of our understanding and shows us that this must needs be so In fact in answering the question what things it is that a man loves in his self love we have implicitly answered the farther question of why he loves them

Unless his consciousness were something more than cognitive unless it ex perienced a partiality for certain of the objects which in succession occupy its ken it could not long maintain itself in existence for by an inscrutable ne cessity each human mind s appearance on this earth is conditioned upon the integrity of the body with which it belongs upon the treatment which that body gets from others and upon the spiritual dispositions which use it as their tool and lead it either towards longevity or to destruction *Its own body then first of all its friends next and finally its spiritual dispositions* MUST *be the su premely interesting* OBJECTS *for each human mind* Each mind to begin with must have a certain minimum of selfishness in the shape of instincts of bodily self seeking in order to exist This minimum must be there as a basis for all further conscious acts whether of self negation or of a selfishness more subtle still All minds must have come by the way of the survival of the fittest if by no directer path to take an intense interest in the bodies to which they are yol ed altogether apart from any interest in the pure Ego which they also pos sess

And similarly with the images of their person in the minds of others I should not be extant now had I not become sensitive to looks of approval or dis approval on the faces among which my life is cast Looks of contempt cast on other persons need affect me in no such peculiar way Were my mental life de pendent exclusively on some other person s welfare either directly or in an in direct way then natural selection would unquestionably have brought it about that I should be as sensitive to the social vicissitudes of that other person as I now am to my own Instead of being egoistic I should be spontaneously altruis tic then But in this case only partially realized in actual human conditions though the self I empirically love would have changed my pure Ego or Thinker would have to remain just what it is now

played by oursel es. What greets our ey es is what w know best mo t deeply under stand because w ursel es have felt it and li ed throu h it. We know what has plou hed these furrows deepened these shadows blanched this hair and other faces may be handsomer but no can speak to us o interest us like this.[1]

Moreover this author goes on to show that our own thin s are *fuller* for us than those of others because of the memories they awaken and the practical hopes and expectations they arouse This alone would empha ize them apart from any value deri ed from their belon ing to oursel es We may conclude with him then that *an original central self feeling can ne er explain the passion*

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Only one more point connected with our self regard need be mentioned We have spoken of it so far as active instinct or emotion It remains to peak of it as cold *intellectual self estimation* We may wei h our own Me in the balance of praise and blame as easily as we weigh other people —thou h with difficulty quite as fairly The *just* man is the one who can weigh him elf impartially Im partial we ghing presupposes a rare faculty of abstraction from the vividness with which as Herr Horwicz has pointed out things known as intimately as our own possessions and performances appeal to our imagination and an equally rare power of vividly representing the affairs of others But granting these rare powers there is no reason why a man should not pass judgment on himself quite as objectively and well as on anyone else No matter how he *feels* about himself unduly elated or unduly dep ed s

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to th primitive f this sober intellectual sort, hich ertainly m t f t is L He says that when th tte tio is turned inward po elf as Personality towards ur sel es the kind f ther persons. set higher in distress t some od displayed by d Rese tment would never tain t th m no exercise them. By what means, then through hat fictio [I] can tur und and play them f po elf? Or h w mes it that w btain any satisfaction by p tting sell in th pla f th ther party? Perh ps the simplest form of th reflected ct is that expressed by Self w rth and Self-estim tion based and begun upo observ tio l the way and d ct f ur fell w-beings. W soon

First the objection

The fact is indubitable that one s own children always pass for the prettiest and brightest the wine from one s own cellar for the best—at least for its price—one s own house and horses for the finest With what tender admiration do we con over our own little deed of benevolence! our own frailties and misdemeanors how ready we are to acquit ourselves for them when we notice them at all on the ground of extenu ating circumstances ! How much more really comic are our own jokes than those of others which unlike ours will not bear being repeated ten or twelve times over! How eloquent striking powerful our own speeches are! How appropriate our own address! In short how much more intelligent soulful better is everything about us than in anyone else The sad chapter of artists and authors conceit and vanity belongs here

The prevalence of this obvious preference which we feel for everything of our own is indeed striking Does it not look as if our dear Ego must first lend its color and

original and central object of our life of feeling and the ground both of whatever special ideas and of whatever special feelings ensue?

Herr Horwicz goes on to refer to what we have already noticed that various things which disgust us in others do not disgust us at all in ourselves

To most of us even the bodily warmth of another for example the chair warm from another s sitting is felt unpleasantly whereas there is nothing disagreeable in the warmth of the chair in which we have been sitting ourselves

After some further remarks he replies to these facts and reasonings as fol lows

We may with confidence affirm that our own possessions in most cases please us better [not because they are ours] but simply because we know them better realize them more intimately feel
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self is heard and understood better than when it is played by another We get more exactly all the details penetrate more deeply into the musical thought We may mean while perceive perfectly well that the other person is the better performer and yet nevertheless—at times—get more enjoyment from our own playing because it brings the melody and harmony so much nearer home to us This case may almost be taken as typical for the other cases of self love On close examination we shall almost always find that a great part of our feeling about what is ours is due to the fact that we *live closer* to our own things and so feel them more thoroughly and deeply As a friend of mine was about to marry he often bored me by the repeated and minute way in which he would discuss the details of his new household arrangements I wondered that so intellectual a man should be so deeply interested in things of so external a nature But as I entered a few years later the same condition myself these matters

fort whilst in the latter case they came home to me with irresistible urgency and vividly took possession of my fancy So it is with many a one who mocks at decora tions and titles until he gains one himself And this is also surely the reason why one s own portrait or reflection in the mirror is so peculiarly interestin a thing to contem plate not on account of any absolute *c'est moi* but just as with the music

played by ourselves. What greets our eyes is what we know best most deeply under stand because we oursel es have felt t and li ed through it. We know what has pl ughed these furr ws deepe ed these shad ws blanched this hair and other faces may be handsomer but none can peak to us or interest us like this.[1]

Moreover this author goes on to show that our own things are *fuller* for us than those of others because of the memories they awaken and the practical hopes and expectations they arouse This alone would emphasize them apart from any value derived from their belonging to ourselves We may conclude with him then that *an ors r..l ce ir l self feel ng can never explain the passion ate warmth of our self regardin emotions which must on the co trary be addressed directly to special things less abst act and e pty of content To these th ngs the ame of self' may be given or to our conduct towards them the name of selfish ess" but ne ther in the self nor the selfishness does the pure Th ker play the l tle role*

Only one more point connected with our elf regard need be mentioned We have spoken of it so far as active instinct or emotion It remains to peak of it as cold *intellectual self-est mation* We may wei h our own Me in the balance of praise and blame as easily as we weigh other people —though with difficulty quite as fairly The *just* man is the one who can wei h himself impartially Im partial we hin presupposes a rare faculty of abstraction from the vividness with which as Herr Horwicz has pointed out things known as intimately as

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The fact is indubitable that one s own children always pass for the prettiest and brightest the wine from one s own cellar for the best—at least for its price—one s own house and horses for the finest With what tender admiration do we con over our own little deed of benevolence! our own frailties and misdemeanors how ready we are to acquit ourselves for them when we notice them at all on the ground of extenuating circumstances'! How much more really comic are our own jokes than those of others which unlike ours will not bear being repeated ten or twelve times over! How eloquent striking powerful our own speeches are! How appropriate our own address! *In short how much more intelligent soulful better is everything about us than in* anyone else The sad chapter of artists and authors conceit and vanity belongs here.

The prevalence of this obvious preference which we feel for everything of our own is indeed striking Does it not look as if our dear Ego must first lend its color and flavor to anything in order to make it please us? Is it not the simplest explanation for all these phenomena so consistent among themselves to suppose that the Ego the self which forms the origin and centre of our *thinking* life is at the same time the original and central object of our life of feeling and the ground both of whatever special ideas and of whatever special feelings ensue?

Herr Horwicz goes on to refer to what we have already noticed that various things which disgust us in others do not disgust us at all in ourselves

To most of us even the bodily warmth of another for example the chair warm from another s sitting is felt unpleasantly whereas there is nothing disagreeable in the warmth of the chair in which we have been sitting ourselves

After some further remarks he replies to these facts and reasonings as follows

We may with confidence affirm that our own possessions in most cases plea e us better [not because they are ours] but simply because we know them better realize them more intimately feel them more deeply We learn to appreciate what is ours in all its details and shadings whilst the goods of others appear to us in coarse outlines nd rude averages Here are some examples A piece of music which one plays one s self is heard and understood better than when it is played by another We get more exactly all the details penetrate more deeply into the musical thought We may meanwhile perceive perfectly well that the other person is the better performer and yet nevertheless—at times—get more enjoyment from our own playing because it brings the melody and harmony so much nearer home to us This case may almost be taken as typical for the other cases of self love On close examination we shall almost always find that a great part of our feeling about what is ours is due to the fact that we *live closer* to our own things and so feel them more thoroughly and deeply As a friend of mine was about to marry he often bored me by the repeated and minute way in which he would discuss the details of his new household arrangements I wondered that so intellectual a man should be so deeply interested in things of so external a nature But as I entered a few years later the same condition myself these matters acquired for me an entirely different interest and it became my turn to turn them over and talk of them unceasingly The reason was simply this that in the first instance I *understood* nothing of these things and their importance for domestic comfort whilst in the latter case they came home to me with irresistible urgency and

plate not on account of any absolute *c'est moi* but just as with the music

The Pure Ego

Having summed up in the above table the principal results of the chapter thus far I have said all that need be said of the constituents of the phenomenal self and of the nature of self regard. Our decks are consequently cleared for the struggle with that pure principle of personal identity which has met us all along our preliminary exposition but which we have always shied from and treated as a difficulty to be postponed Ever since Hume s time it has been justly regarded as the most puzzling puzzle with which psychology has to deal and whate er view one may espouse one has to hold his position against heavy odds If with the Spiritualists, one contend for a substantial soul or transcendental principle of unity one can give no positive account of what that may be. And if with the Humians one deny such a principle and say that the stream of passing thoughts is all one runs against the entire common sense of mankind of which the belief in a distinct principle of selfhood seems an integral part Whate er solution be adopted in the pages to come we may as well make up our minds in ad ance that it will fail to satisfy the majority of those to whom t is addressed The best way of approachin the matter will be to take up first—

The Sense of Personal Identity

In the last chapter it was stated in as radical a way as possible that the thoughts which we actually know to exist do not fly about loose but seem each to belon to some one thinker and not to another Each thought out of a multitude of other thoughts of which it may think, is able to distinguish those which belong to its own Ego from those which do not. The former have a warmth and intimacy about them of which the latter are completely devoid bein merely concei ed in a cold and foreign fashion, and not appearing as blood relatives bringing their greetings to us from out of the past.

Now this consciousness of personal sameness may be treated either as a subjective phenomenon or as an objective deliverance as a feelin or as a truth We may explain how one bit of thou ht can come to jud e other bits to belong to the same Ego with itself or we may crit cise its judgment and decide how far it may tally with the nature of things

As a mere subjecti e phenomenon the judgment presents no difficulty or mystery peculiar to itself It belongs to the great class of judgments of sameness and there is nothing more remarkable in making a judgment of sameness in the first person than in the second or the third. The intellectual operations seem essent all al ke whether I say I am the same or whether I say the

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[1] course essential to all thinking The things are conjoined in the thought whatev r may be the relation in which they appear to the thought The thinking them is *th k g* them together even if only with the result of judging that they d not *bel g* together This sort of *s bjective synthes s* essential to knowledge as such (whenever it has a complex object) must not be con

one s credit one s fame one s intellectual ability, one s goodness, or whatever the case may be

The empirical life of Self is divided as below into

	Material	*Social*	*Spiritual*
SELF SEEKING	Bodily Appetites and Instincts Love of Adornment Foppery Acquisitiveness Constructiveness Love of Home etc	Desire to please be noticed admired etc Sociability Emulation Envy Love Pursuit of Honor Ambition etc	Intellectual Moral and Religious Aspiration Conscientiousness
SELF ESTIMATION	Personal Vanity Modesty etc Pride of Wealth Fear of Poverty	Social and Family Pride Vainglory Snobbery Humility Shame etc	Sense of Moral or Mental Superiority Purity etc Sense of Inferiority or of Guilt

make comparisons among the individuals about us we see that one is stronger and does more work than another and in consequence perhaps, receives more pay We see one putting forth perhaps more kindness th [illegible] ence receiving more love We [illegible] and drawing after them the [illegible] a sociations towards persons [illegible] able to the inferior To the [illegible] reward and feel that to be in [illegible] a be a happier lot than falls to others Desiring as we do from the primary motives of our being to possess good things and observing these to come by a man s superior exertions we feel a respect for such exertion and a wish that it might be ours We know that we also put forth exertions for our share of good things and on witnessing others we are apt to be reminded of ourselves and to make comparisons with ourselves, which comparisons derive their interest from the substantial consequences Having thus once learned to look at other persons as perform n [illegible] s realiz ng fruits to [illegible] xercise neither diffi [illegible] reward As we [illegible] e [illegible] and another—which is worthier so we decide between self and all other men being however in this decision under the bias of our own desir s A couple of pages farther on we read By the terms Self complacency S lf gratulation is indicated a positive enjoyment in dwellin [illegible] our own m ts and belo g ngs As in other [illegible] plation of excellence or pleasing qualities [illegible] ondness or love Self pity is also regarded [illegible] iverted to ourselves from a more immediate [illegible] us and unreal Still as we can view self in the l ght f another person we can feel towa ds it the emotion of pity called forth by others in our situation

Th s account of Professor Bain s is it will be observed a good specimen of the old fashioned mode of explaining the several emot ns as rapid calculations of results and the transfer of feeli g from one object to another associated by contiguity or sim larity with the first Zoological evolutionism which came up since Professor Bain first wrote has made us see on the contrary that many emotions must be *pr m t vely* aroused by special objects None are more w rthy of being r nked prim tive than the lf gratulation and humiliation attendant on our wn successes and failures in the main functions of life. We need no borrowed reflection for the e feel ngs Professor Bain s accou t pplies to but that small fraction of our self feel ng which reflective criticism can add to or subtract from, the total mass —Lotze has some pages on the modifications of our self regard by universal judgments in *Microcos os* book v chap v § 5

of them infallibly brings some degree of organic emotion in the shape of quickened heart beats oppressed breathin or some other alteration even though it be a slight one in the general bodily tone The character of warmth then in the present self reduces itself to either of two things—something in the feeling which we have of the thought itself as thinkin or else the feeling of the body s actual existence at the moment—or finally to both. We cannot realize our present self without simultaneously feeling one or other of these two things. Any other fact which brings these two things with it into consciousness will be thought with a warmth and an intimacy like those which cling to the present self

Any *distant* self which fulfils this condition will be thought with such warmth and intimacy But which distant selves *do* fulfil the condition when represented?

Obviously those and only those which fulfilled it when they were alive. *Them* we shall imagine with the animal warmth upon them to them may possibly cling the aroma, the echo of the thinking taken in the act And by a natural consequence we shall assimilate them to each other and to the warm and intimate self we now feel within us as we think and separate them as a collection from whatever selves have not this mark, much as out of a herd of cattle let loose for the winter on some wide western prairie the owner picks out and sorts together when the time for the round up comes in the spring all the beasts on which he finds his own particular brand

The various members of the collection thus set apart are felt to belong with each other whenever they are thought at all The animal warmth etc., is their herd mark, the brand from which they can never more escape It runs through them all like a thread through a chaplet and makes them into a whole which we treat as a unit, no matter how much in other ways the parts may differ *inter se* Add to this character the farther one that the distant selves appear to our thought as ha in for hours of time been *cont uous* with each other and the most recent ones of them continuous with the Self of the present moment melt in into it by slow degrees and we get a still stron er bond of union As we think we see an identical bodily thing when in pite of changes of structure it exists continuously before our eyes or when howe er interrupted its presence its quality returns unchan ed so he e we think we experience an identical *Self* when it appears to us in an analogous way Continuity makes us unite what dissimilarit mi ht otherwise separate similarity makes us unite what discontinu
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confuse them with those cold and pale-appearin ones which he ascribes to Paul. As well might he confound Paul s body which he only sees with his own body which he sees but also feels Each of us when he awakens says Here s the same old self again just as he says Here s the same old bed the same old room the same old wo ld.

The sense of our own personal identity then is exactly l ke any o e of our other perc pt ons of same ess amo g phenomena It is a conclus on grou ded either on the esembl nce in a fundame tal respect or on the cont nuity before the m nd of the phenomena compared

founded with *objective synthesis* or union instead of difference or disconnection known among the things[1] The subjective synthesis is involved in thought s mere existence Even a really disconnected world could only be *known* to be such by having its parts temporarily united in the Object of some pulse of consciousness[2]

The sense of personal identity is not then, this mere synthetic form essential to all thought It is the sense of a sameness perceived *by* thought and predicated of things *thought about* These things are a present self and a self of yesterday The thought not only thinks them both but thinks that they are identical The psychologist looking on and playing the critic might prove the thought wrong and show there was no real identity —there might have been no yesterday or at any rate no self of yesterday or if there were the sameness predicated might not obtain or might be predicated on insufficient grounds In either case the personal identity would not exist as a *fact* but it would exist as a *feeling* all the same the consciousness of it by the thought would be there and the psychologist would still have to analyze that and show where its illusoriness lay Let us now be the psychologist and see whether it be right or wrong when it says *I am the same self that I was yesterday*

We may immediately call it right and intelligible so far as it posits a past time with past thoughts or selves contained therein—these were data which we assumed at the outset of the book Right also and intelligible so far as it thinks of a present self—that present self we have just studied in its various forms The only question for us is as to what the consciousness may mean when it calls the present self the *same* with one of the past selves which it has in mind

We spoke a moment since of warmth and intimacy This leads us to the answer sought For, whatever the thought we are criticising may think about its present self that self comes to its acquaintance or is actually felt with warmth and intimacy Of course this is the case with the *bodily* part of it we feel the whole cubic mass of our body all the while it gives us an unceasing sense of personal existence Equally do we feel the inner nucleus of the spiritual self either in the shape of yon faint physiological adjustments or (adopting the universal psychological belief) in that of the pure activity of our thought taking place as such Our remoter spiritual material and social selves so far as they are realized come also with a glow and a warmth for the thought

[1] *Also nur dadurch dass ich ein Mannigfaltiges gegebener Vorstellungen* in einem Bewusstsein *verbinden kann ist es moglich dass ich die* Identitat des Bewusstseins *in diesen* Vorstellungen *selbst vorstelle d h die analytische Einheit der Apperception ist nur unter der Voraussetzung irgend einer synthetischen moglich* In this passage (*Critique of Pure Reason* 2nd ed § 12) Kant calls by the names of analytic and synthetic apperception what we here mean by objective and subjective synthesis respectively It were much to be desired that some one might invent a good pair of terms in which to record the distinction—those used in the text are certainly very bad but Kant s seem to me still worse Categorical unity and transcendental synthesis would also be good Kantian but hardly good human speech

[2] So that we might say by a sort of bad pun only a connected world can be known as disconnected I say bad pun because the point of view shifts between the connectedness and the disconnectedness The disconnectedness is of the realities known the connectedness is of the knowledge of them and reality and knowledge of it are from the psychological point of view held fast to in these pages two different facts.

This description of personal identity will be recognized by the instructed reader as the ord nary doctrine professed by the empirical school Association ists in En land and France Herbartians in Germany all describe the Self as an ag regate of which each part as to its *being* is a separate fact So far so good then thus much is true whatever farther things may be true and it is to the imperishable glory of Hume and Herbart and their successors to have taken so much of the meanin of personal identity out of the clouds and made of the Self an emp rical and verifiable thing

But in leaving the matter here and sayin that this sum of passin things is all these writers have neglected certain more subtle aspects of the Unity of Consciousness to which we next must turn

Our recent simile of the herd of cattle will help us It will be remembered that the beasts were brought to ether into one herd because their owner found on each of them his brand The owner symbolizes here that section of consciousness or pulse of thought which we have all along represented as the

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branded unless he belon ed to the owner of the herd They are not his because they are branded they are branded because they are his So that it seems as if our description of the belonging together of the various selves as a belonging to ether which is merely *represented* in a later pulse of thou ht had knocked the bottom out of the matter and omitted the most characteristic one of all the featu es found in the herd—a feature which common sense finds in the phe-

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act one is sure that it involves a real belon in to a real Owner to a pure p r itual entity of some kind Relation to this ent wh

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y sucking severally to him Just so common sense insists there must be a real proprietor in the case of the selves or else their actual accretion into a personal consciousness would never have taken place To the usual emp ric st explanat on of personal consciousness this is a form dable reproof because all the indiv dual thou hts and feelin s which have succeeded each other up to date are represented by ordinary Associa t nism as in some inscrutable way inte rating or gummin themselves to- g th r on their o n account and thus fus ng into a stream All the incompre- hensib l t es which in Chapter VI we saw to attach to the idea of things fusing without a *med m* apply to the empiricist description of personal identity

And it must not be taken to mean more than these grounds warrant or treated as a sort of metaphysical or absolute Unity in which all differences are overwhelmed The past and present selves compared are the same just so far as they *are* the same and no farther A uniform feeling of warmth of bodily existence (or an equally uniform feeling of pure psychic energy?) pervades them all and this is what gives them a *generic* unity and makes them the same in *kind* But this generic unity coexists with generic differences just as real as the unity And if from the one point of view they are one self, from others they are as truly not one but many selves And similarly of the attribute of continuity it gives its own kind of unity to the self—that of mere connectedness, or unbrokenness a perfectly definite phenomenal thing—but it gives not a jot or tittle more And this unbrokenness in the stream of selves like the unbrokenness in an exhibition of dissolving views in no wise implies any farther unity or contradicts any amount of plurality in other respects

And accordingly we find that where the resemblance and the continuity are no longer felt the sense of personal identity goes too We hear from our parents various anecdotes about our infant years but we do not appropriate them as we do our own memories Those breaches of decorum awaken no blush those bright sayings no self complacency That child is a foreign creature with which our present self is no more identified in feeling than it is with some stranger s living child to day Why? Partly because great time gaps break up all these early years—we cannot ascend to them by continuous memories and partly because no representation of how the child *felt* comes up with the stories We know what he said and did but no sentiment of his little body of his emotions of his psychic strivings as they felt to him comes up to contribute an element of warmth and intimacy to the narrative we hear and the main bond of union with our present self thus disappears It is the same with certain of our dimly recollected experiences We hardly know whether to appropriate them or to disown them as fancies or things read or heard and not lived through Their animal heat has evaporated the feelings that accompanied them are so lacking in the recall or so different from those we now enjoy that no judgment of identity can be decisively cast

Resemblance among the parts of a continuum of feelings (especially bodily feelings) experienced along with things widely different in all other regards *thus constitutes the real and verifiable personal identity which we feel* There is no other identity than this in the stream of subjective consciousness which we described in the last chapter Its parts differ but under all their differences they are knit in these two ways and if either way of knitting disappears the sense of unity departs If a man wakes up some fine day unable to recall any of his past experiences so that he has to learn his biography afresh or if he only recalls the facts of it in a cold abstract way as things that he is sure once happened or if without this loss of memory his bodily and spiritual habits all change during the night each organ giving a different tone and the act of thought becoming aware of itself in a different way he *feels* and he *says* that he is a changed person He disowns his former me gives himself a new name identifies his present life with nothing from out of the older time Such cases are not rare in mental pathology but as we still have some reasoning to do we had better give no concrete account of them until the end of the chapter

to transmit both its motion and its ... es to a second which took both up into *its* consciousness and passe ... that the other balls had held and ... the na ... adop ... moter ... last for what possesses the possessor possesses the possessed

It is impossible to discover any *verifiable* features in personal identity which this sketch does not contain impossible to imagine how any transcendent non phenomenal sort of an Arch E o were he there could shape matters to any other result or be known in time by any other fruit than just this production of a stream of consciousness each section of which should know and know ing hug to itself and adopt all those that went before —thus standing as the *representative* of the entire past stream and which should similarly adopt the objects already adopted by any portion of this spiritual stream Such standing as-representati e and such adopting are perfectly clear phenomenal relations The Thought which whilst it knows another Thought and the Object of that Other appropriates the Other and the Object which the Other appropriated is still a perfectly distinct phenomenon from that Other it may hardly resem ble it it may be far removed from it in pace and time.

The only point that is obscure is the *act of appropriation* itself Already in enumerating the constituents of the self and their rivalry I had to use the word appropriate And the quick witted reader probably noticed at the time in hear ing how one constituent was let drop and disowned and another one held fast to and espoused that the phrase was meaningless unless the constituents were objects in the hands of something else A thing cannot appropriate itself it *is* itself and still less can it disown itself There must be an agent of the appro priat n and disownin but that a ent we have already named It is the

...

ject in its own hands it never appropriates or disowns itself It appropriates *to* itself it is the actual focus of accreti n the hook from which the chain of past selves dangles planted firmly in the Present which alone passes for real and thus keeping the chain from being a purely ideal thing Anon the hook itself will drop into the past w th all it carries and then be treated as an object and appro priated by a new Thought in the new present which will serve as living hook in turn. The present moment of consciousness is thus as Mr Hodgson says the darkest in the whole ser es. It may feel its own immediate existence—we have al alon admitted the possibility of this hard as it is by direct introspection to ascertain the fact—but nothin can be known *about* it till it be dead and gone Its appropriations are therefore less to *itself* than to the most intimately felt *part of its p ese t Object the body a d the cent al adj stments* which accom pany the act of thinking in the head *These are the real cleus of our personal id ntity* and it is their actual existence realized as a solid p esent fact which makes us say *as sure as I exist* those past facts were part of myself They are the kernel to which the *rep esented* parts of the Self are assimilated

But in our own account the medium is fully assigned the herdsman is there in the shape of something not among the things collected but superior to them all namely the real present onlooking remembering judging thought or identifying section of the stream This is what collects — owns some of the past facts which it surveys and disowns the rest —and so makes a unity that is actualized and anchored and does not merely float in the blue air of possibility And the reality of such pulses of thought with their function of knowing it will be remembered that we did not seek to deduce or explain but simply assumed them as the ultimate kind of fact that the psychologist must admit to exist

But this assumption though it yields much still does not yield all that common sense demands The unity into which the Thought—as I shall for a time proceed to call with a capital T the present mental state—binds the individual past facts with each other and with itself does not exist until the Thought is there It is as if wild cattle were lassoed by a newly created settler and then owned for the first time But the essence of the matter to common sense is that the past thoughts never were wild cattle they were always owned The Thought does not capture them but as soon as it comes into existence it finds them already its own How is this possible unless the Thought have a *substantial* identity with a former owner —not a mere continuity or a resemblance as in our account but a *real unity?* Common sense in fact would drive us to admit what we may for the moment call an Arch Ego dominating the entire stream of thought and all the selves that may be represented in it as the ever self same and changeless principle implied in their union The Soul of Metaphysics and the Transcendental Ego of the Kantian Philosophy are as we shall soon see but attempts to satisfy this urgent demand of common sense But for a time at least we can still express without any such hypotheses that appearance of nerve lapsing ownership for which common sense contends

For how would it be if the Thought the present judging Thought instead of being in any way substantially or transcendentally identical with the former owner of the past self merely inherited his title and thus stood as his legal representative now? It would then if its birth coincided exactly with the death of another owner *find* the past self already its own as soon as it found it at all and the past self would thus never be wild but always owned by a title that never lapsed We can imagine a long succession of herdsmen coming rapidly into possession of the same cattle by transmission of an original title by bequest May not the title of a collective self be passed from one Thought to another in some analogous way?

It is a patent fact of consciousness that a transmission like this actually occurs Each pulse of cognitive consciousness each Thought dies away and is replaced by another The other among the things it knows knows its own predecessor and finding it warm in the way we have described greets it saying Thou art *mine* and part of the same self with me Each later Thought knowing and including thus the Thoughts which went before is the final receptacle —and appropriating them is the final owner—of all that they contain and own Each Thought is thus born an owner and dies owned transmitting whatever it realized as its Self to its own later proprietor As Kant says it is as if elastic balls were to have not only motion but knowledge of it and a first ball were

Th Theory of the Soul

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should examine the Soul critically
other advantages as a theory over the simple phenomenal notion f
thought accompanying a stream of cerebral activity by a law yet unexplained.

The theory of the Soul is the theory of popular philosophy and of scholasticism which is only popular philosophy made systematic. It declares that the principle of individuality within us must be *substantial* for psychic phenomena are activities, and there can be no activity without a concrete agent. This substantial agent cannot be the brain but must be something *immaterial* for its activity thought, is both immaterial and takes cognizance of immaterial things and of material things in general and intelligible as well as in particular and sensible ways—all which powers are incompatible with the nature of matter of which the brain is composed Thought moreover is simple whilst the activities of the brain are compounded of the elementary activities of each of its parts Furthermore thought is spontaneous or free whilst all material activity is determined *ab ext a* and the will can turn itself against all corporeal goods and appetites which would be impossible were it a corporeal function. Fo these objective reasons the principle of psychic life must be both immaterial and simple as well as substantial must be what is called *a Soul* The same consequence follows from subjective reasons Our consciousness of personal dentity assures us of our essential simplicity the owner of the various constituents of the self as we have seen them the hypothetical Arch-Ego whom we provisionally conceived as possible is a real entity of whose existence self consciousness makes us directly aware No material agent could thus turn round and grasp *its* ... grasp something else than the agent And if a
conscious of itself
kind The Soul then exists as a simple spiritual substance in which ...
psychic faculties operations and affections inhere

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This substantialist view of the soul was essentially the view of Plato and

accreted and knit on and even were Thought entirely unconscious of itself in the act of thinking these warm parts of its present object would be a firm basis on which the consciousness of personal identity would rest[1] Such consciousness then as a psychologic fact, can be fully described without supposing any other agent than a succession of perishing thoughts endowed with the functions of appropriation and rejection and of which some can know and appropriate or reject objects already known appropriated or rejected by the rest

To illustrate by diagram let *A* *B* and *C* stand for three successive thoughts each with its object inside of it If *B* s object be *A* and *C* s object be *B* then

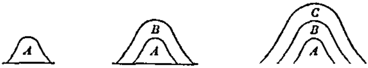


FIG 34

A *B* and *C* would stand for three pulses in a consciousness of personal identity Each pulse would *be* something different from the others but *B* would know and adopt *A* and *C* would know and adopt *A* and *B* Three successive states of the same brain on which each experience in passing leaves its mark might very well engender thoughts differing from each other in just such a way as this

The passing Thought then seems to be the Thinker and though there *may* be another non phenomenal Thinker behind that, so far we do not seem to need him to express the facts But we cannot definitely make up our mind about him until we have heard the reasons that have historically been used to prove his reality

The Pure Self or Inner Principle of Personal Unity

To a brief survey of the theories of the Ego let us then next proceed They are three in number as follows

1) The Spiritualist theory
2) The Associationist theory
3) The Transcendentalist theory

[1] Some subtle reader will object that the Thought cannot call any part of its Object I and knit other parts on to it without first knitting that part on to *Itself* and that it cannot knit it on to Itself without knowing Itself —so that our supposition (above p 196) that the Thought may conceivably have no immediate knowledge of Itself is thus overthrown To which the reply is that we must take care not to be duped by words The words *I* and *me* signify nothing mysterious and unexampled—they are at bottom only names of *emphasis* and Thought is always emphasizing something Within a tract of space which it cognizes it contrasts a *here* with a *there* within a tract of time a *now* with a *then* of a pair of things it calls one *this* the other *that* I and *thou* I and *it* are distinctions exactly on a par with these—distinctions possible in an exclusively *objective* field of knowledge the I meaning for the Thought nothing but the bodily life which it momentarily feels The sense of my bodily existence however obscurely recognized as such *may* then be the absolute original of my conscious selfhood the fundamental perception that *I am* All appropriations *may* be made *to* it *by* a Thought not at the moment immediately cognized by itself Whether these are not only logical possibilities but actual facts is something not yet dogmatically decided in the text.

the word Soul be understood merely to express that claim, it is a good word to use. But if it be held *to do more*, to gratify the claim,—for instance, to connect rationally the thought which comes with the processes which occur, and to mediate intelligibly between their own disparate natures,—then it is an illusory term. It is, in fact, with the word Soul as with the word Substance in general. To say that phenomena inhere in a Substance is at bottom only to record one's protest against the notion that the bare existence of the phenomena is the total truth. A phenomenon would not itself be, we insist, unless there were something *more* than the phenomenon. To the more we give the provisional name of Substance. So, in the present instance, we ought certainly to admit that there is more than the bare fact of coexistence of a passing thought with a passing brain-state. But we do not answer the question 'What is that more?' when we say that it is a 'Soul' which the brain-state affects. This kind of more *explains* nothing; and when we are once trying metaphysical explanations we are foolish not to go as far as we can. For my own part I confess that the moment I become metaphysical and try to define the more, I find the notion of some sort of an *anima mundi* thinking in all of us to be a more promising hypothesis, in spite of all its difficulties, than that of a lot of absolutely individual souls. Meanwhile, as *psychologists*, we need not be metaphysical at all. The phenomena are enough, the passing Thought itself is the only *verifiable* thinker, and its empirical connection with the brain-process is the ultimate known law.

To the other arguments which would prove the need of a soul, we may also turn a deaf ear. The argument from free-will can convince only those who believe in free-will; and even they will have to admit that spontaneity is just as possible, to say the least, in a temporary spiritual agent like our 'Thought' as in a permanent one like the supposed Soul. The same is true of the argument

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any of the properties of the mental life from otherwise known properties of the soul. They simply find various characters ready-made in the mental life, and these they clap into the Soul, saying, 'Lo! behold the source from whence they flow!' The merely verbal character of this 'explanation' is obvious. The Soul invoked, far from making the phenomena more intelligible, can only be made intelligible itself by borrowing their form,—it must be represented, if at all, as a transcendent stream of consciousness duplicating the one we know.

Altogether, the Soul is an outbirth of that sort of philosophizing whose great maxim, according to Dr. Hodgson, is: 'Whatever you are *totally* ignorant of, assert *to be* the explanation of everything else.'

Locke and Kant, whilst still believing in the soul, began the work of undermining the notion that we know anything about it. Most modern writers of the mitigated spiritualistic, or dualistic philosophy—the *Scotch school*, as it is often called among us—are forward to proclaim this ignorance, and to attend exclu

of Aristotle It received its completely formal elaboration in the middle ages It was believed in by Hobbes, Descartes Locke, Leibnitz Wolf Berkeley and is now defended by the entire modern dualistic or spiritualistic or common sense school Kant held to it while denying its fruitfulness as a premise for deducing consequences verifiable here below Kant s successors the absolute idealists profess to have discarded it —how that may be we shall inquire ere long Let us make up our minds what to think of it ourselves

It is at all events needless for expressing the actual subjective phenomena of consciousness as they appear We have formulated them all without its aid by the supposition of a stream of thoughts each substantially different from the rest but cognitive of the rest and appropriative of each other s content At least if I have not already succeeded in making this plausible to the reader I am hopeless of convincing him by anything I could add now The unity the identity the individuality and the immateriality that appear in the psychic life are thus accounted for as phenomenal and temporal facts exclusively, and with no need of reference to any more simple or substantial agent than the present Thought or section ' of the stream We have seen it to be single and unique in the sense of having no *separable* parts (above p 155 ff)—perhaps that is the only kind of simplicity meant to be predicated of the soul The present Thought also has being —at least all believers in the Soul believe so—and if there be no other Being in which it inheres it ought itself to be a substance If *this* kind of simplicity and substantiality were all that is predicated of the Soul then it might appear that we had been talking of the soul all along without knowing it when we treated the present Thought as an agent an owner and the like But the Thought is a perishing and not an immortal or incorruptible thing Its successors may continuously succeed to it resemble it, and appropriate it but they *are* not it whereas the Soul Substance is supposed to be a fixed unchanging thing By the Soul is always meant something *behind* the present Thought another kind of substance, existing on a non phenomenal plane

When we brought in the Soul at the end of Chapter VI as an entity which the various brain processes were supposed to affect simultaneously and which responded to their combined influence by single pulses of its thought it was to escape integrated mind stuff on the one hand and an improbable cerebral monad on the other But when (as now after all we have been through since that earlier passage) we take the two formulations first of a brain to whose processes pulses of thought *simply* correspond and second of one to whose processes pulses of thought *in a Soul* correspond and compare them together we see that at bottom the second formulation is only a more roundabout way than the first of expressing the same bald fact That bald fact is that *when the brain acts a thought occurs* The spiritualistic formulation says that the brain processes knock the thought so to speak out of a Soul which stands there to receive their influence The simpler formulation says that the thought simply *comes* But what positive meaning has the Soul when scrutinized but the *ground of possibility* of the thought? And what is the knocking ' but the *determining of the possibility to actuality?* And what is this after all but giving a sort of concreted form to one s belief that the coming of the thought when the brain processes occur has *some* sort of ground in the nature of things? If

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for retaining the Soul—at least for those who demand a plenitude of retri u tion The mere stream of consciousness with its lapses of memory cannot possibly be as responsible as a soul which *is* at the judgment day all that it ever was To modern readers however who are less insatiate for retribution than their grandfathers this argument will hardly be as convincing as it seems once to have been

One of the Soul has always been to account for and at the same time t h per onal consciousness The thou
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thought transference mesmeric influence and pirit control which are being alleged nowadays on better authority than ever before to be too sure about that po nt either The definitively closed nature of our personal consciousness is probably an a erage statistical resultant of many conditions but not an eleme tary fo ce or fact so that if one wishes to p eserve the Soul the less he draws his arguments from *that* quarter the better So long as our elf on the whole makes itself good and practically maintains itself as a closed indiv dual why as Lotze says is not that enough? And why is the *being* an individual in some inaccess ble metaphysical v ay so much prouder an achievement?[1]

My final c nclusion then about the substantial Soul is that it explains nothing and guarantees nothing Its successive thou hts are the only intelligible d d fin t l to ascertain the correlations of

from the rest of this book If I ever use
popular way The eader who finds any comfort in the idea of the Soul is how

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out what that something *is* which exerts these energies we know not It is only as we are conscious of the action of these energies that we are conscious of the existence of mind It is only by the exertion of its own powers that the mind becomes cognizant of their exist n Th cognizance of its powers how

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The Soul theory is then a complete superfluity so far as accounting for the actually verified facts of conscious experience goes So far no one can be compelled to subscribe to it for definite scientific reasons The case would rest here and the reader be left free to make his choice were it not for other demands of a more practical kind

The first of these is *Immortality* for which the simplicity and substantiality of the Soul seem to offer a solid guarantee A stream of thought for aught that we see to be contained in its essence may come to a full stop at any moment but a simple substance is incorruptible and will by its own in rt n sist in Being so long as the C

the question What is their bearing on a future life?

The Soul however when closely scrutinized guarantees no immortality of a sort *we care for* The enjoyment of the atom like simplicity of their substance *in sæcula sæculorum* would not to most people seem a consummation devoutly to be wished The substance must give consciousness con ne but of this the Moreover in the our moral ideas there has come to be something ridiculous in the way our forefathers had of grounding their hopes of immortality on the simplicity of their substance The demand for immortality is nowadays essentially teleological We believe ourselves immortal because we believe ourselves *fit* for immortality A substance ought surely to perish we think if not worthy to survive and an insubstantial stream to prolong itself provided it be worthy if the nature of Things is organized in the rational way in which we trust it is Substance or no substance soul or stream what Lotze says of immortality is about all that human wisdom can say

We have no other principle for dec d

orld s course That this principle admits of no further application in human hands need hardly be said *We* surely know not

atre must n t mislead us They are the successive perceptions only that constitute the mind nor have we the most distant notion of the place where these scenes are represented nor of the material of which it is composed

But Hume after doing this good piece of introspective work proceeds to pour out the child with the bath and to fly to as great an extreme as the substantialist philosophers As they say the Self is nothing but Unity unity abstract and absolute so Hume says it is nothing but Diversity diversity abstract and absolute whereas in truth it is that mixture of unity and diversity which we ourselves have already found so easy to pick apart We found among the objects of the stream certain feelings that hardly changed that stood out warm and vivid in the past just as the present feeling does now and we found the present feeling to be the centre of accretion to which *de proche en proche* these other feelin s are *by the judging Thought* felt to cling Hume says nothing of the judgin Thought and he denies this thread of resemblance this core of sameness running throu h the ingredients of the Self to exist even as a phenomenal th ng To him there is no *tertium quid* between pure unity and pure separateness A succession of ideas connected by a close relation affords to an accurate view as perfect a notion of diversity as if there was *no manner of relation at all*

All o di tinct pe cept ons a e distinct existences and the mind never perceives a y al n ctio m g dist ct xistenc s Did our percept ons either inhere in something simple or i di id al or *d d the m nd perce ve some eal co ect o* among them ther w uld be n difficulty in the case. For my part I must plead the pri ilege of a sceptic and confess that this difficulty s too hard fo my understanding I pretend not how er to p o ounce t i super ble Others perhaps may discover some hypothesis that will r co cile these contradictions [1]

u as their diversity is a real separation both connection and separation are ways in which the past thoughts appear to the present Thought —unl ke each other in respect of date and certain qual ties—this is the separation alike in other qualities and continuous in time—this is the connection In demand n a more real connection than this obvious and verifiable likeness and cont nuity Hume seeks the world behind the looking glass and gives a strikin example of that Absolutism which is the great disease of philosoph c Thought

The chain of distinct existences into which Hume thus chopped up our stream was adopted by all of his successors as a complete inventory of the facts The associationist Philos h

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the work Two deas one of A succeeded by an other of B were transmuted into a third idea of *A after B* An idea from

[1] Appe dix t bo k i f Hum T *tis* *f H m* *N tur*

ever perfectly free to continue to believe in it for our reasonings have not established the non existence of the Soul they have only proved its superfluity for scientific purposes

The next theory of the pure Self to which we pass is

The Associationist Theory

Locke paved the way for it by the hypothesis he suggested of the same sub stance having two successive consciousnesses or of the same consciousness being supported by more than one substance He made his readers feel that the *important* unity of the Self was its verifiable and felt unity and that a meta physical or absolute unity would be insignificant so long as a *consciousness* of diversity might be there

Hume showed how great the consciousness of diversity actually was In the famous chapter on Personal Identity in his *Treatise of Human Nature* he writes as follows

> There are some philosophers who imagine we are every moment intimately con scious of what we call our SELF that we feel its existence and its continuance in ex istence and are certain beyond the evidence of a demonstration both of its perfect identity and simplicity Unluckily all these positive assertions are contrary to that very experience which is pleaded for them nor have we any idea of Self after the manner it is here explained It must be some one impression that gives rise to every real idea If any impression gives rise to the idea of Self that impres sion must continue invariably the same through the whole course of our lives since self is supposed to exist after that manner But there is no impression constant and invariable Pain and pleasure grief and joy passions and sensations succeed each other and never all exist at the same time For my part when I enter most inti mately into wha
> other of heat or
> catch *myself* at
> the perception When my perceptions are removed for any time as by sound sleep so long am I insensible of *myself* and may truly be said not to exist And were all my perceptions removed by death and could I neither think nor feel nor see nor love nor hate after the dissolution of my body I should be entirely annihilated nor do I conceive what is farther requisite to make me a perfect non entity If anyone upon serious and unprejudiced reflection thinks he has a different notion of *himself* I must confess I can reason no longer with him All I can allow him is that he may be in the right as well as I and that we are essentially different in this particular He may perhaps perceive something simple and continued which he calls *himself* thou h I am certain there is no such principle in me
>
> But setting aside some metaphysicians of this kind I may venture to affirm of the rest of mankind that they are *nothing but a bundle or collection of different percep tions* which succeed each other with an inconceivable rapidity and are in a perpetual flux and movement Our eyes cannot turn in their sockets without varying our per ceptions Our thought is still more variable than our sight and all our other senses and faculties contribute to this change nor is there any single power of the soul which remains unalterably the same perhaps for one moment The mind is a kind of the atre where several perceptions successively make their appearance pass repass glide away and mingle in an infinite variety of postures and situations *There is prop erly no simplicity in it at one time nor identity in different* whatever natural propen sion we may have to imagine that simplicity and identity The comparison of the the

After Mr Thompson M. Taine and the two Mills deserve credit for seeking to be as clear as they can Taine tells us in the first volume of his *Intelligence* what the Ego is — a continuous web of conscious events no more really distinct from each other[1] than rhomboids trian les and squares marked with chalk on a plank are really distinct for the plank itself is one In the second volume he says all these parts have a common character embedded in them that of being *internal* [this is our character of warmness otherwise named] This charac ter is abstracted and isolated by a mental fiction and is what we are *conscious of* as our self— this table *within* is what each of us calls *I* or *me* Obviously M Taine forgets to tell us what this each of us is which suddenly starts up and performs the abstraction and calls its product I or me The character h f us merely the present judg

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James Mill after defining Memory as a train of associated ideas beginning with that of my past self and ending with that of my present self defines my Self as a train of ideas of which Memory declares the first to be continuously connected with the last The successive associated ideas run as it were into a single point of consciousness. John Mill annotating this account says

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the two things are essentially the same that my memory

daw on a given day and my consciousness of being the same person who ascended Skiddaw on that day are two modes f stating the same fact a fact which psychology has as et failed to resolve into anything more elementary In analyzing the complex phenomena of consciousness we must come to something ultimate and we seem to have reached two elements which have a good *prima facie* claim to that title. There first the difference between a fact and the Thought of that fact a distinction which we are able to cognize in the past, and which then constitutes Memory and in the future, when it constitutes Expectation but in neither case can we give any c

n t Secondly in addition to this and setting out f m

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I ha t the pr m men 11 f wh h connected by an inexplicable tie that distinguishes th

also f m the

den e t ha

ce ar und me. his su ession feelings,

is that by which I distinguish my Self Myself is the person who had that series of feelings and I know nothing of myself by direct knowledge except that I had them. But there is bond f some sort among all the parts of the series which makes me

[1] Distinctly t bservatio h adds. T wh se bserv ? th tsad psychologists, the Egos, their wn, or the plank ? *Dar f k mmt est* 1 ("That is th point.)

Analysis etc., J S. Mill edition, vol. p. 33 Th as it w re is delightfully characteristic f the school.

last year returning now was taken to be an idea *of last year* two similar ideas stood for an *idea of similarity* and the like palpable confusions in which certain facts *about* the ideas, possible only to an outside knower of them were put into the place of the ideas own proper and limited deliverance and content Out of such recurrences and resemblances in a series of discrete ideas and feelings a knowledge was somehow supposed to be engendered in each feeling that it *was* recurrent and resembling and that it helped to form a series to whose unity the name *I* came to be joined In the same way substantially, Herbart[1] in Germany tried to show how a conflict of ideas would fuse into a *manner of representing itself* for which *I* was the consecrated name[2]

The defect of all these attempts is that the conclusion pretended to follow from certain premises is by no means rationally involved in the premises A feeling of any kind if it simply *returns* ought to be nothing else than what it was at first If memory of previous existence and all sorts of other cognitive functions are attributed to it when it returns it is no longer the same but a widely different feeling and ought to be so described *We* have so described it with the greatest explicitness We have said that feelings never do return We have not pretended to *explain* this we have recorded it as an empirically ascertained law analogous to certain laws of brain physiology and seeking to define the way in which new feelings do differ from the old we have found them to be *cognizant* and *appropriative* of the old whereas the old were always cognizant and appropriative of something else Once more this account pretended to be nothing more than a complete description of the facts It explained them no more than the associationist account explains them But the latter both assumes to explain them and in the same breath falsifies them and for each reason stands condemned

It is but just to say that the associationist writers as a rule seem to have a lurking bad conscience about the Self and that although they are explicit enough about what it is namely a train of feelings or thoughts they are very shy about openly tackling the problem of how it comes to be aware of itself

reader s lack of discernment or are undiscerning themselves

Mr D G Thompson is the only associationist writer I know who perfectly escapes this confusion and *postulates* openly what he needs All states of consciousness he says imply and postulate a subject Ego whose substance is unknown and unknowable to which [why not say *by* which?] states of consciousness are referred as attributes but which in the process of reference becomes objectified and becomes itself an attribute of a subject Ego which lies still beyond and which ever eludes cognition though ever postulated for cognition [3] This is exactly our judging and remembering present Thought described in less simple terms

[1] Herbart believed in the Soul too but for him the Self of which we are conscious is the empirical Self—not the soul

[2] *Cf* again the remarks on pp 104–06 above.

[3] *System of Psychology* (1884) vol 1, p 114

concessions amount ... to the admission of some-
thing very like the Sc
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feelings them. I es
ing save its
stance come a
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tom he makes the same blunder as Hume the sensa
p t e The tie of resemblance and continuity which the remembering
... but a mere product of the laws

all be no real tie Mill unwilling to admit
scholastic to place it in a non phenomenal world

John Mill s concessions may be regarded as the *definit e bankruptcy of the associatio ist description* of the consciousness of self starting as it does with the best intentions and dimly conscious of the path but perplexed in the ex

less positi th t nsatio oth feeling t whi h it di tly refers w ll exist in the f t ... tw t tes f consci sness be d q tely
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f lings wh ch is war f ts lf as past and f t d w d d t th lt rn ti f believing th t th mind Eg m thi g diff t f m any n f f lings, p ssi b lities f th m I pting th par d th t something which *hypoth si* is b t a se

d t t th l which t d t fit and himself y says g in

kn l dg f so m ch that has g bef e.

say that they were feelings of a person who was the same person throughout [according to us this is their warmth and resemblance to the central spiritual self now actually felt] and a different person from those who had any of the parallel successions of feelings and this bond to me constitutes my Ego Here I think the question must rest until some psychologist succeeds better than anyone else has done in showing a mode in which the analysis can be carried further [1]

The reader must judge of our own success in carrying the analysis farther The various distinctions we have made are all parts of an endeavor so to do John Mill himself in a later written passage so far from advancing in the line of analysis, seems to fall back upon something perilously near to the Soul He says

The fact of recognizing a sensation remembering that it has been felt before is the simplest and most elementary fact of memory and the *inexplicable tie* which connects the present consciousness with the past one of which it reminds me is as near as I think we can get to a positive conception of Self That there is something real in this tie real as the sensations themselves and not a mere product of the laws of thought without any fact corresponding to it I hold to be indubitable This original element to which we cannot give any name but its own peculiar one without implying some false or ungrounded theory is the Ego or Self As such I ascribe a reality to the Ego—to my own mind—different from that real existence as a Permanent Possibility which is the only reality I acknowledge in Matter We are forced to apprehend every part of the series as linked with the other parts by *something in common* which is not the feelings themselves any more than the succession of the feelings is the feelings themselves and as that which is the same in the first as in the second in the second as in the third in the third as in the fourth and so on must be the same in the first and in the fiftieth this common element is a permanent element But beyond this we can affirm nothing of it except the states of consciousness themselves The feelings or consciousnesses which belong or have belonged to it and its possibilities of having more are the only facts there are to be asserted of Self—the only positive attributes except permanence which we can ascribe to it [2]

Mr Mill s habitual method of philosophizing was to affirm boldly some general doctrine derived from his father and then make so many concessions of detail to its enemies as practically to abandon it altogether [3] In this place the

[1] J Mill s *Analysis* vol II p 175

[2] *Examinat on of Ham lton* 4th ed. p 263

[3] H s chapter on the Psychological Theory of M nd is a beautiful case in point and his concessions there have become so celebrated that they must be quoted for the reader s benefit. He ends the chapter with these wo ds (*loc cit* p 247) The theory the efore which resolves Mind into a series of feelings with a background of possibilities of feeling can effectually w thstand the most invidious of the arguments d rected against it But groundless as are the extrinsic objections the theory has intrinsic difficulties which we have not set forth and which it seems to me beyond the power of metaphysical analysis to remo e

The thread of conscious ess which composes the m nd s phenomenal l fe consists not only of present sensations but likewise in part of memories and expectations Now what are these? In th mselves,
re pect not distinguish
tions or feelings of wh —
the peculiarity that each of them in olves a belief in more than its own present existence A sensation involves only this but a remembrance of sensation even if n t referred to any particular date involves the suggestion and belief that a sensation of which it is a copy or representation actually existed in the past and an expectat on involves the belief more

Kant to mean the thinking it always so that whatever its other determinations be it may be known as *thought by me* Though this consciousness that *I think it* need not be at every moment explicitly realized it is always *capable* of being realized For if an object *incapable* of being combined with the idea of a thinker were there how could it be known how related to other objects how form part of experience at all?

The awareness that *I think* is therefore implied in all experience. No connected consciousness of anything without that of *Self* as its presupposition and transcendental condition! All things then so far as they are intelligible at all are so through combination with pure consciousness of *Self* and apart from this, at least potential combination nothing is knowable to *us* at all

But this self whose consciousness Kant thus established deductively as a *co dit o s e qua non* of experience is in the same breath denied by him to have ... ranscend ... *about* it ... ndental ... *that* we ... e es nly the simple and utterly empty idea *I* of which we cannot even say we have a notion but only a consciousness which accompanies all notions In this *I* or *he* or *it* (the thing) which thinks, nothing more is represented than the bare transcendental Subject of the knowledge =x which is only recognized by the thoughts which are its predicates and of which taken by itself we cannot form the least concept on (*ibid* Paralogisms) The pure Ego of all apperception is thus for Kant not the soul but only that subject which is the necessary correlate of the Object in all knowledge There *is* a soul Kant thinks but this mere ego-form of our consciousness tells us nothing about it neither whether it be substantial nor whether it be immaterial nor whether it be simple nor whether it be permanent These declarations on Kant s part of the utter barrenness of the consciousness of the pure Self and of the consequent impossibility of any deductive or rational psychology are what more than anything else earned for him the title of the all-destroyer The only self we know anything positive *about* he thinks is the empirical *me* not the pure *I* the self which is an object among other objects and the constituents of which we ourselves have seen, and recognized to be phenomenal things appearing in the form of space as well as time

This for our purposes, is a sufficient account of the transcendental Ego

Those purposes go no farther than to ascertain whether anything in Kant s concept on ought to make us give up our own of a rememberin and appropriatin Thought incessantly renewed In many respects Kant s meaning is ob-

It must be uced, in justice t what was said bo p. 77 ff that eith Kant his su cessors anywh re discriminat between the *presen* f th apperceivin E t th combined bject, and th *cons ness by* that E *f* its wn presence and f ts distinctness fr m hat it apperceives. That th Object must be kn w t somethin which *think* and that t must be kn wn t som thing hich *think that it thi ks* are treated by them as den tical necessities,—by what logic, does t ppear Kant tries to soften th jump in the reasoning by saying the thought *f itself* th part f th E eed nly be *potential*—"the 'I think must be *capable* f accompanying all ther kn wledg —b t th ught which is only potential is ctually th ught at all which practically gives up th case.

treme' at last with the inadequacy of those simple feelings non cognitive non transcendent of themselves which were the only baggage it was willing to take along One must *beg* memory knowledge on the part of the feelings of something outside themselves That granted every other true thing follows naturally and it is hard to go astray The knowledge the present feeling has of the past ones is a real tie between them so is their resemblance so is their con tinuity so is the one s appropriation of the other all are real ties realized in the judging Thought of every moment the only place where *disconnections* could be realized did they exist Hume and Mill both imply that a disconnec tion can be realized there whilst a tie cannot But the ties and the disconnec tions are exactly on a par in this matter of self consciousness The way in which the present Thought appropriates the past is a real way so long as no other owner appropriates it in a more real way and so long as the Thought has no grounds for repudiating it stronger than those which lead to its appropriation But no other owner ever does in point of fact present himself for my past and the grounds which I perceive for appropriating it—viz continuity and resem blance with the present—outweigh those I perceive for disowning it—viz dis tance in time My present Thought stands thus in the plenitude of ownership of the train of my past selves is owner not only *de facto* but *de jure* the most real owner there can be, and all without the supposition of any inexplicable tie but in a perfectly verifiable and phenomenal way

Turn we now to what we may call

The Transcendentalist Theory

which owes its origin to Kant Kant s own statements are too lengthy and obscure for verbatim quotation here so I must give their substance only Kant starts as I understand him from a view of the *Object* essentially like our own description of it on p 178 ff that is it is a system of things qualities or facts in relation *Object* is that in the knowledge [*Begriff*] of which the Manifold of a given Perception is connected [1] But whereas we simply begged the vehicle of this connected knowledge in the shape of what we call the present Thought or section of the Stream of Consciousness (which we declared to be the ultimate fact for psychology) Kant denies this to be an ultimate fact and insists on analyzing it into a large number of distinct though equally essential elements The Manifoldness of the Object is due to Sensibility which *per se* is chaotic and the unity is due to the synthetic handling which this Manifold receives from the higher faculties of Intuition Apprehension Imagination Understanding and Apperception It is the one essential spontaneity of the Understanding which under these different names brings unity into the manifold of sense

> The Understanding *is* in fact nothing more than the faculty of binding together *a priori* and of bringing the Manifold of given ideas under the unity of Apperception which consequently is the supreme principle in all human knowledge (§ 12)

The material connected must be *given* by lower faculties to the Understand ing for the latter is not an intuitive faculty but by nature empty And the bringing of this material under the unity of Apperception is explained by

[1] *Critique of Pure Reason* 2nd ed § 13

ously mixed up with that of the substantial soul So on every possible account we are excused from using it instead of our own term of the present passing Thought as the principle by which the Many is simultaneously known.

The *ambiguity* referred to in the meaning of the transcendental Ego is as to whether Kant signified by it an *Agent* and by the Experience it helps to constitut operation or whether the experience is an event *produced* in an unas- si *lemt* therein contained If an op cou is meant there is no such prior existence and the they are in union. d language are everywhere the very words of one who is formed And yet the ing of the sort in m cide what to think c

Well if it be so Transcendentalism is faced and the E o only a cheap and nasty ed tion of the soul All our reasons for preferring the Thought to the Soul apply with redoubled force when the Soul is shrunk to this estate The Soul truly explained nothing the syntheses which she perfo mply taken ready made and clapped on to her as expressions of he semblance of nobility a spons ble and permane and windy an abortion as Philosophy can s son s tragedies if the good Kant with all his honesty and strenuous pains should ha e deemed this conception an important outbirth of his thought.

But we ha e seen that Kant deemed it of next to no importance at all It was reserved for his F chtean and Hegelian successors to call it the first Principle of Philosophy to pell its name in cap tals and pronounce it with adoration to act in short as if they were go ng up in a balloon whenever the notion of it crossed their mind Here again however I am uncertain of the facts of history and kn w that I may not read my authors aright The whole lesson of Kantian and post Kantian speculati n is t seems to me the lesson of simplicity With Kant compl cati h h f thou ht d statement was an inborn infirmity enhanced by the mu ing fever ophy have howe e som what simpl r deliverances come and unable to find any definite psychology in what Hegel Rosenkranz or Erdmann tells us of the Ego I turn to Caird and Green

pressly said that the problem is not t sh w h w experience arises [ent t ht] b t f what it consists [besteht] (Kant *Theorie d Erf hrung* [87] p. 38.)

scure but it will not be necessary for us to squeeze the texts in order to make sure what it actually and historically was If we can define clearly two or three things which it may *possibly* have been that will help us just as much to clear our own ideas

On the whole a defensible interpretation of Kant s view would take somewhat the following shape Like ourselves he believes in a Reality outside the mind of which he writes but the critic who vouches for that reality does so on grounds of faith for it is not a verifiable phenomenal thing Neither is it manifold The Manifold which the intellectual functions combine is a mental manifold altogether which thus *stands between* the Ego of Apperception and the outer Reality but still stands inside the mind In the function of knowing there is a multiplicity to be connected and Kant brings this multiplicity inside the mind The Reality becomes a mere empty *locus* or unknowable the so-called Noumenon the manifold phenomenon is in the mind We on the contrary put the Multiplicity with the Reality outside and leave the mind simple Both of us deal with the same elements—thought and object—the only question is in which of them the multiplicity shall be lodged Wherever it is lodged it must be synthetized when it comes to be thought And that particular way of lodging it will be the better which in addition to describing the facts naturally makes the mystery of synthesis least hard to understand

Well Kant s way of describing the facts is mythological The notion of our thought being this sort of an elaborate internal machine shop stands condemned by all we said in favor of its simplicity on page 179 Our Thought is not composed of parts however so composed its objects may be There is no originally chaotic manifold in it to be reduced to order There is something almost shocking in the notion of so chaste a function carrying this Kantian hurly burly in her womb If we are to have a dualism of Thought and Reality at all the multiplicity should be lodged in the latter and not in the former member of the couple of related terms The parts and their relations surely belong less to the knower than to what is known

But even were all the mythology true the process of synthesis would in no whit be *explained* by calling the inside of the mind its seat No mystery would be made lighter by such means It is just as much a puzzle *how* the Ego can employ the productive Imagination to make the Understanding use the categories to combine the data which Recognition Association and Apprehension receive from sensible Intuition as how the Thought can combine the objective facts Phrase it as one may the difficulty is always the same *the Many known by the One* Or does one seriously think he understands better *how* the knower connects its objects when one calls the former a transcendental Ego and the latter a Manifold of Intuition than when one calls them Thought and Things respectively? Knowing must have a vehicle Call the vehicle Ego or call it Thought Psychosis Soul Intelligence Consciousness Mind Reason Feeling —what you like—it must *know* The best grammatical subject for the verb *know* would if possible be one from whose other properties the knowing could be deduced And if there be no such subject the best one would be that with the fewest ambiguities and the least pretentious name By Kant s confession the transcendental Ego has no properties and from it nothing can be deduced Its name is pretentious and as we shall presently see has its meaning ambigu

Again if we examine the constituents of any perceived object we shall find alike that it is only for consciousness that they can exist and that the consciousness for which they thus exist cannot be merely a series of phenomena or a succession of states. It then becomes clear that there is a function of consciousness, as exercised in the most rudimentary experience [namely the function of *synthesis*] which is incompatible with the definition of consciousness as any sort of succession of any sort of phenom e

and to espouse instead of it an ent ty cop ca ...

spects but differin from it in being out of time" What psychology can gain by this barter would be hard to divine Moreover this resemblance of the timeless Ego to the Soul is completed by other resemblances still The monism of the Post Kantian idealists seems always lapsing into a regular old fashioned spiritualistic dualism They incessantly talk as if like the Soul their All thinker were an Agent operating on detached materials of sense This may come from the accidental fact that the English writings of the school have been more polemic than constructive and that a reader may often take for a positive profession a statement *ad hominem* meant as part of a reduction to the absurd or mistake ... k owled e into lements for a dramat c myth about it ... constan... place Facts are said to become incorporated with other facts ... *act on* of a combinin self-consciousness upon data of sensation."

Every object we perceive requires in order to its presentation the *action* of a princip of onsciousness not itself subject to ... *as of time upon successive* appearances such ... as may *hold the appearances together* without fusion, in an apprehend d f t

It is needless to repeat that the connection of things in our knowledge is in no whit *expl ed* by making it the deed of an agent whose essence is self identity and who is out of time The agency of phenomenal thought coming and going in time is just as easy to *understand* And when it is furthermore said that the agent that combines is the same self-distinguishing subject which in another mode of its activity presents the manifold object to itself the unintelligibilities become quite paroxysmal and we are forced to confess that the entire school of thought in question in spite of occasional glimpses of something more refined still dwells habitually in that mythological stage of thought where phenomena are explained as results of dramas enacted by entities which but reduplicate the characters of the phenomena themselves The self must not only *know* its object —that is too bald and dead a relation to be written down and left in its static state. The knowing must be painted as a famous victory" in which the object s distinctness is in some way overcome

The self exists as one self only as it opposes itself as object, to itself as subject and immediately denies and transcends that opposition. Only because it is such a concrete

T H. Green, *Prolegomena to Ethics* §§ 57 6 64. *Loc. cit* § 64.

The great difference, practically, between these authors and Kant is their complete abstraction from the onlooking Psychologist and from the Reality he thinks he knows or rather it is the absorption of both of these outlying terms into the proper topic of Psychology viz the mental experience of the mind under observation The Reality coalesces with the connected Manifold the Psychologist with the Ego knowing becomes connecting and there results no longer a *finite or criticisable but an absolute Experience of which the Object* and the Subject are always the same Our finite Thought is virtually and potentially this eternal (or rather this timeless) absolute Ego and only provisionally and speciously the limited
The later sections of our Stream
ones *are* those earlier ones just as in — — —
time the same [1] This solipsistic character of an Experience conceived as absolute really annihilates psychology as a distinct body of science

Psychology is a natural science an account of particular finite streams of thought coexisting and succeeding in time It is of course conceivable (though far from clearly so) that in the last metaphysical resort all these streams of thought may be thought by one universal All thinker But in this metaphysical notion there is no profit for psychology for grant that one Thinker does think in all of us still what He thinks in me and what in you can never be deduced from the bare idea of Him The idea of Him seems even to exert a positively paralyzing effect on the mind The existence of finite thoughts is suppressed altogether Thought s characteristics as Professor Green says are

> not to be sought in the incidents of individual lives which last but for a day No knowledge nor any mental act involved in knowledge can properly be called a phenomenon of consciousness For a phenomenon is a sensible event related in the way of antecedence or consequence to other sensible events but the consciousness which constitutes a knowledge is not an event so related nor made up of such events

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ult—
reductions which post Kantian idealism performs

Absolute Self-consc ousness
Reason or Expe ence

Transcendental Ego		World	
Psychologist	Thought	Thought s Object	Psychologist s Reality

Psycholog st s Object

These reductions account for the ubiqu tousness of the psychologist s fallacy in the

W th this all possible rival formulations have been discussed The literature of the Self is large but all its authors may be classed as radical or mitigated representatives of the three sc med substantialism association ism or transcendentalism O incorporates essential elemer *been a quarrel between assoc the indecomposable unity of to allow that perishing' pu*

We may sum up by saying that person —
two elements an objective person known by a passin subjective Thought and recogn zed as continuing in time. *Hereafter let us use the words* ME *and* I *for the empirical person and the judging Thought*

Certa n vicis tudes in the ME *demand our notice*

In the first place although its changes are gradual they become in time great The central part of the *me* is the feeling of the body and of the adjust ments in the head and in the feelin of the body should be included that of the general emotional tones and tendencies for at bottom these are but the habits in wh ch organic activ ties and sensib lities run Well from infancy to old age this assemblage of feelings most constant of all is yet a prey to slow mutation Our powers bod ly and mental change at least as fast Our possessions notori ously are perishable facts

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h fi d w ld less pace th th t which b ds his isib! h iz h w d rs

unity which has in itself a resolved contradiction can the intelligence cope with all the manifoldness and division of the mighty universe and hope to master its secrets. As the lightning sleeps in the dew drop so in the simple and transparent unity of self consciousness there is held in equilibrium that vital antagonism of opposites which seems to rend the world asunder The intelligence is able to understand the world or in other words to break down the barrier between itself and things and find itself in them just because its own existence is implicitly the solution of all the division and conflict of things [1]

This dynamic (I had almost written dynamitic) way of representing knowledge has the merit of not being tame To turn from it our own psychological formulation is like turning from the fireworks trap doors and transformations of the pantomime into the insipidity of the midnight where

ghastly through the drizzling rain
On the bald street breaks the blank day![2]

And yet turn we must with the confession that our Thought'—a cognitive phenomenal event in time—is if it exist at all itself the only Thinker which the facts require The only service that transcendental egoism has done to psychology has been by its protests against Hume s bundle theory of mind But this service has been ill performed for the Egoists themselves let them say what they will believe in the bundle and in their own system merely *tie it up* with their special transcendental string invented for that use alone Besides they talk as if with this miraculous tying or relating the Ego s duties were done. Of its far more important duty of choosing some of the things it ties and appropriating them to the exclusion of the rest they tell us never a word To sum up then my own opinion of the transcendentalist school it is (whatever ulterior metaphysical truth it may divine) a school in which psychology at least has naught to learn and whose deliverances about the Ego in particular in no wise oblige us to revise our own formulation of the Stream of Thought [3]

[1] E Caird *Hegel* (1883) p 149

[2] One is almost tempted to believe that the pantomime state of mind and that of the Hegelian dialectics are emotionally considered one and the same thing In the pantomime all common things are represented to happen in impossible ways people jump down each other s throats houses turn inside out old women become young men everything passes *into its opposite* with inconceivable celerity and skill and this so far from producing perplexity brings rapture to the beholder s mind And so in the Hegelian logic relations elsewhere recognized under the insipid name of distinctions (such as that between knower and object many and one) must first be translated into impossibilities and contradictions then transcended and identified by miracle ere the proper temper is induced for thoroughly enjoying the spectacle they show

[3] The reader will please understand that I am quite willing to leave the hypothesis of the transcendental Ego as a substitute for the passing Thought open to discussion on *general speculative grounds* Only *in this book* I prefer to stick by the common sense assumption

treatment more defined than that which the sciences themselves accord and so it may fare in the end with our passing Thought We have ourselves seen (pp 193–97) that the *sensible* certainty of its existence is less strong than is usually assumed My quarrel with the transcendental Egoists is mainly about their *grounds* for their belief Did they consistently propose it as a *substitute* for the passing Thought did they consistently *deny the latter's existence* I should respect their position more But so far as I can understand them they habitually believe in the passing Thought also They seem even to believe in the Lockian

False memories are by no means rare occurrences in most of us and when ever they occur they distort the consciousness of the me Most people prob ably are in doubt about certain matters ascribed to their past. They may have

false memory is the accounts we give to others of our experiences Such ac counts we almost always make both more simple and more interesting than the truth We quote what we should have said or done rather than what we really said o did and in the first tellin we may be fully aware of the distinction. But e e lon the fiction expels the reality from memory and reigns in its stead alone This is one great source of the fallibility of testimony meant to be quite honest. Especially where the marvellous is concerned the story takes a tilt that way and the memory follows the story Dr Carpenter quotes from Miss Cobbe the following as an instance of a very common sort

It happen d e to the Write to hear a m t crupulously conscientious friend

good faith.

It is next to impossible to get a story of this sort accurate in all its details although it is the inessential details that suffer most change Dickens and Bal zac were said to have constantly mingled their fictions with their real experi ences Every one must have known *some* specimen of our mortal dust so intoxicated with the thought of his own person and the sound of his own voice as never to be able even to think the truth when his autobiography was in ques tion Amiable harmless radiant J V ! mayst thou ne er wake to the difference between thy real and thy fondly imagined self!

2 When we pass beyond alterations of memory to abnormal *alterations in the present self* we ha e still graver disturbances. These alterations are of three main types from the descriptive point of v ew But certain cases unite features of two r more types and our knowledge of the elements and causes of these changes of personality is so slight that the di ision into types must not be re garded as having any profound significance. The types are

a) Insane delusions
b) Alternating sel es
c) Mediumships or possess ons.

How I Work nd Play p. oo

F careful study f th errors in narratives, see E Gurney *Phantasms f the Living* vol 1, pp 6– 58 I th *P ce di g f th Society for Psychical Re ear h* for M y 887 Mr Richard Hodgso sh ws by an extra dinary rray f instances h w utterly inaccurate every ne's descriptio from mem ry f rapid series f events is certain to be.

See Josiah R yce (in *Mind* L 3 p. 44, and *Pro ding f Am Soc f Psy h Re earch* vol. x, p 366) for evidence that certain sort f hallucinatio f memory which he calls "pseudo-presentiment is no uncommon phen menon.

The identity which the *I* discovers, as it surveys this long procession, can only be a relative identity that of a slow shifting in which there is always some common ingredient retained [1] The commonest element of all, the most uniform is the possession of the same memories However different the man may be from the youth both look back on the same childhood and call it their own

Thus the identity found by the *I* in its *me* is only a loosely construed thing an identity on the whole just lil e that which any outside observer might find in the same assemblage of facts *We often say of a man he is so changed one* would not know him and so does a man less often speak of himself These changes in the *me* recognized by the I or by outside observers may be grave or slight They deserve some notice here

The Mutations of the Self

may be divided into two main classes

1 Alterations of memory and
2 Alterations in the present bodily and spiritual selves

[illegible]

state of which no recollection is retained? Law in accord with common sense says No he is not the same person forensically now which he was then These losses of memory are a normal incident of extreme old age and the person s *me* shrinks in the ratio of the facts that have disappeared

In dreams we forget our waking experiences they are as if they were not And the converse is also true As a rule no memory is retained during the waking state of what has happened during mesmeric trance although when again entranced the person may remember it distinctly and may then forget facts be*longing to the waking state We thus have within the bounds of healthy* mental life an approach to an alternation of *me s*

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venerati n which does not forbid love We f nd him sunk perhaps, in the imbecility of idiotism unable to recogn ze us —ignorant al ke of the past and of the future, and li ing only in the sensib lity of an mal gratification We seek the favorite companion of our childh od whose tende ness of heart etc We find him hardened into a man meeting us scarcely *with the cold hypocrisy of dissembled friendship—in h s general elations to the world care* less of the misery *l e* is not to feel When we observe all th s do w use only a m ta phor of l ttle meaning when we say of h m that he is become a different person and that his mind and character re changed? In what does the identity consist? The supposed test of identity when applied to the mi d in these cases completely fails It neither affects, nor is affected in the same m nner in the same circumsta ces It t erefore if the test be a just o e s not the same identical m nd (T Bro n *Lect es on the Philo ophy of the Human M d On Mental Id ntity*)

[1] Sir John Cutler had a pair of black worsted stockings which his maid darned so often with silk that th y became t last a p ir of silk stockings Now supposing these stock ngs of Sir J hn s endued with some degree of co sciousness at every p rticul r darn ng they would have been sensible th t they were the same ndividual pair of stock gs both before ld ha e co tinued in them through ll the

(Pope s *Mar*

the latte be omes confirmed. It may graduall; co tract associations with the trains of deas which characterized the old self or portions of the latter may be extinguished the n og ess of the cereb al malady so that little by little the opposition of

1 orms are calmed. But by that time

may gain be quiet and his tho g t

err eou ideas are alw ys p esent w th the adhesions they have contracted, as tu c troll ble premises and the man is *no longer the same but a really new person* his old elf transformed.

But the patient him elf rarely continues to describe the change in just these terms unless ne him or the loss of old ones play a predominant part cease to be felt

What the pa rise to these co person to conce ve One patient has another self that repeats all his tho gurs him Others among whom are some of the first characters in history have familiar dæmons who speak with them and are eplied to In another someone makes his thoughts for him Another has two bodies lying in different beds Some pat ents feel as if they had lost parts of the r bodies teeth brain stomach etc In some it is made of wood glass butter etc In some it does not exist any longer or is dead or is a foreign object quite separate from the speaker s self Occasionally parts of the body lose their connection for consciousness with the rest and are treated as belonging to another person and moved by a hostile will Thus the right hand may fi ht with the left as with an enemy Or the cries of the patient himself are ass gned to another person with whom the patient expresses sympathy The literature of insanity is filled with narratives of such illusions as these M Taine quotes from a patient of Dr Krishaber an account *of suffe ings from which it will be seen how completely aloof from what is* normal a man s experience may suddenly become

> After the first or se ond day t was for s me weeks impossibl to bserve or analyze myself The uffering—angin pect ris—was too erwhelming It was not till th first days f January that I ould gi e an ount to myself f what I experienced. Her is the first thing of whi h I etain clear remembran e I was al e nd already p y t permanent sual t uble when I was s ddenly eized with a ual tro bl infinitely mo e p un ed. Object grew small d eded t infinite dis- t es—me and things t geth I was myself unmeasurably far way I looked b ut

lasted int rmittently fo tw years Constantly t seemed as if my legs did not

W G esinger *Mental D* as § 9

See th interesting case f ld Stump in the *P ce ding of the American S c. for Psy h Re ear h* p 55

a) In insanity we often have delusions projected into the past, which are melancholic or sanguine according to the character of the disease But the worst alterations of the self come from present perversions of sensibility and impulse which leave the past undisturbed but induce the patient to think that the present *me* is an altogether new personage Something of this sort happens normally in the rapid expansion of the whole character intellectual as well as volitional which takes place after the time of puberty The pathological cases are curious enough to merit longer notice

The basis of our personality as M Ribot says is that feeling of our vitality which because it is so perpetually present remains in the background of our consciousness

once to change our body and put another into its place skeleton vessels viscera muscles skin everything made new except the nervous system with its stored up memory of the past There can be no doubt that in such a case the afflux of unaccustomed vital sensations would produce the gravest disorders Between the old sense of existence engraved on the nervous system and the new one acting with all the intensity of its reality and novelty there would be irreconcilable contradiction [1]

With the beginnings of cerebral disease there often happens something quite comparable to this

Masses of new sensation hitherto foreign to the individual impulses and ideas of the same inexperienced kind for example terrors representations of enacted crime of enemies pursuing one etc At the outset these stand in contrast with the old familiar *me* as a strange often astonishing and abhorrent *thou* [2] Often their invasion into the former circle of feelings is felt as if the old self were being taken possession of by a dark overpowering might and the fact of such possession is described in fantastic images Always this doubleness this struggle of the old self against the new discordant forms of experience is accompanied with painful mental conflict with passion with violent emotional excitement This is in great part the reason for the common experience that the first stage in the immense majority of cases of mental disease is an emotional alteration particularly of a melancholic sort If now the brain affection which is the immediate cause of the new abnormal train of ideas be not relieved

[1] *Malad es de la mémo re* p 85 The little that would be left of personal consciousness if *all* our senses stopped their wo k is ingenuously shown in the remark of the extraordinary anæsthet c youth whose case Profess r Strumpell reports (in the *Deutsches Archiv f klin Med* XXII, p 347 [1878]) This boy whom we shall later find instructive in many connections was totally anæsthetic w thout and (so far as could be tested) within save for the sight of o e eye and the hearing of one ear When his eye was closed he said *Wenn ich nicht seh n ka da* BIN *ich gar n cht*—I no longer *am*

[2] One can comp re the state of the pat ent to noth g so well as to that of a caterpillar which k ping all its caterpill r s ide s and remembrances should suddenly become a butterfly with a butte fly s sen es and sens t ons Between the old and the new state between

they are unknown Hence two conclus ns the first which consists in his saying *I o lo ger am* the second somewhat l ter which consists in his saying *I am anothe person* (H Taine *Théorie de l telligence* 3d ed [1878] p 462)

which case he becomes (it may be) a child again, or by telling him he is another *altogether* imaginary personage in which case all facts about himself seem for the time bein to lapse from out his mind and he throws himself into the new character with a vivacity proportionate to the amount of histrionic imagina tion which he possesses. But in the patholo ical cases the transformation is spo taneous The most famous case perhaps on record is that of Felida X. reported by Dr Azam of Bordeaux. At the age of fourteen this woman began to pass into a secondary state characterized by a chan e in her general dis- position and character as f certain inhibitions previously existing were suddenly remo ed. During the secondary state she remembered the first state but on emerging from it into the first state she remembered nothing of the sec ond At the a e of forty four the duration of the secondary state (which was on the whole superio in quality to the or inal state) had gained upon the latter so much as to occupy most of her time Durin it she remembers the events be- longing to the or inal state but her complete oblivion of the secondary state when the original tate recurs is often very distressin to her as for example when the transition takes place in a carriage on her way to a funeral and she ha n t the least idea which one of her friends may be dead She actually became pre nant durin one of her early secondary states and during her first state had no knowledge of how t h d come to pass. Her distress at these blanks of mem ory is sometimes intense and once drove her to attempt suicide.

To take another example Dr Rieger gi es an account of an epileptic man who for se enteen years had passed his life alternately free in prisons or in asylums his character bein orderly enough in the normal state but alternatin with periods during which he would leave his home for several weeks leading the life of thief and vagabond being sent to jail having epileptic fits and ex citement being accused of malin ering etc etc and with never a memory of the abnormal conditions which were to blame for all his wretchedness.

I ha
f m thi
t all
larcen
f e th
so h That h had epilept
him that f h urs tog ther he ra ed and act d in an abn rmal way

An ther remarkable case is that of Mary Reynolds lately republished again by D Weir Mitchell. This dull and melancholy young woman inhab ti g the Pennsyl ania wilderness in 1811

was f und e m rning l ng after her habitual time fo rising in a pr found sleep f m which i was impossible t ar use her After eight en twenty hours of sleeping she wakened but in a sta e f unnatural consciousness. Memory had fl d. To all in

The umbe f subjects wh can do this with any fertility and exuberance is relati ly quite small.

First in the *Revue scientifique* for May 6, 8 6 then in his book, *Hypnotism Double Conscience t Altér tions de la personnalité* (Paris, 887)

Der Hypnotismus (884) pp 09- 5.

Transactions f the C lleg f Physicians f Philadelphia April 4, 888. Also less com- plete, in *Harper' M gazine* May 860.

belong to me It was almost as bad with my arms As for my head it seemed no longer to exist I appeared to myself to act automatically by an impulsion foreign to myself There was inside of me a new being and another part of myself the old being which took no interest in the new comer I distinctly remember saying to myself that the sufferings of this new being were to me indifferent. I was never really dupe of these illusions but my mind grew often tired of incessantly correcting the new impressions and I let myself go and lived the unhappy life of this new entity I had an ardent desire to see my old world again to get back to my old self This desire kept me from killing myself I was another and I hated I despised this other he was perfectly odious to me it was certainly another who had taken my form and assumed my functions [1]

In cases similar to this it is as certain that the *I* is unaltered as that the *me* is changed That is to say the present Thought of the patient is cognitive of both the old *me* and the new so long as its memory holds good Only within that objective sphere which formerly lent itself so simply to the judgment of recognition and of egoistic appropriation strange perplexities have arisen The present and the past both seen therein will not unite Where is my old me? What is this new one? Are they the same? Or have I two? Such questions answered by whatever theory the patient is able to conjure up as plausible form the beginning of his insane life [2]

A case with which I am acquainted through Dr C J Fisher of Tewksbury has possibly its origin in this way The woman Bridget F

has been many years insane and always speaks of her supposed self as the rat asking me to bury the h

the good woman sa

etc Sometimes she sa

She works at needlework knitting laundry etc and shows her work saying *Isn t*

ds of depression hid her elf under

She was only a rat and wants to

b) The phenomenon of *alternating personality* in its simplest phases seems based on lapses of memory Any man becomes as we say *inconsistent* with himself if he forgets his engagements pledges knowledges and habits and it is merely a question of degree at what point we shall say that his personality is changed In the pathological cases known as those of double or alternate personality the lapse of memory is abrupt and is usually preceded by a period of unconsciousness or syncope lasting a variable length of time In the hypnotic trance we can easily produce an alteration of the personality either by telling the subject to forget all that has happened to him since such or such a date in

[1] *Théorie de l nt lligence* 3d ed (1878) v I II note p 461 Krishaber s book (*La Név opath e cé éb o ca d que* 1873) is full of s m lar observations

s n t tward fortune ften produce such a ch nge in the empirical *me*

habits whether of an active or a p ssi e kind and the exigencies a o p ss t situation that the ind vidu l m y f d no med m of continuity r associ ti n t car y him over f om the one phase to the other of his life Under these co diti ns mental derangement is no unfrequent result.

th way b t t ... nt for words I'll try blows
so I got ff ar
got down on ...
a d looking ba k and grin ing and gro l... she ...

Thus it continued for fi e weeks when o e morning after a protracted sleep she woke and was herself again. She rec gnized the parental, the brotherly and sisterly ti s as though thing had happened and immediately went about the performance of duties incumbent upon her and which s hd pl nned fi e weeks pre iously G eat was her urprise at the change which one N ture bore a diff rent aspect. N t a trace w through which she h d passed H r ramblir humo all w re faded from her mem ry an saw their child her br thers and sisters saw ed, that she had possessed in he first state previous ... as igorous ... d been B t any new acquisitions she had made, and laid up ut returned ... All went o in the ld fash ed wa and t was i ... occurrences of those fi e weeks w uld ne er be repeat d, but these anticipati ns were t t b realized. Afte the l ps of few weeks she fell into a profound sleep and w ke in he ec nd stat t king up her ew life again p ecisely where she had left t hen sh bef re passed f ... Sh was not now a daughter or a sister All the knowl dge she posse... period of sec d co sc ... riods widely separat d we ...

In this tate she cam t understand perfectly th facts f her case not from mem ry b t f om inf rmatio N t her buoyancy of pirits was o great that no depression was p od d On the trary t dded to her cheerfulness and was m de the foun dati as was everything else f mirth.

Thes altern tions f m one state to another ontinued at intervals of varying length f fifteen r sixteen years b t finally ceased when sh attained the ge of thirt fi r thirty six, lea ing her *permanently in her seco d state* In this she remained w th ut change for the last quarter of a century of her life.

The emotional opposition of the two states seems however to have become gradually effaced in Mary Reynolds

Th change f om gay hysterical mischi ous woman, fo d of jests and subject to b urd beli f delus e tio t o e... the joyousness and lo of societ but sobe ed d wn t l el f pra tic l usefulness was gr dual The m t of th tw t fi years whi h f ll wed she was as different f m her melanch ly m b d self from th hil rious o diti n f th early years of h r e d t te Some of h fam spok f t as h r third state Sh des ribed as becoming rati nal indus tri us and ry cheerful y t e sonably seri us possessed f a well-bala ced tem perament and ot ha ing th slightest indicati n f an injured or disturbed mind. F som ears she taught sch l and in that capacity was both useful and acceptable, be ral f rite with old and y ung.

tents and purposes she was as a being for the first time ushered into the world All of the past that remained to her was the faculty of pronouncing a few words and this seems to have been as purely instinctive as the wailings of an infant for at first the words which she uttered were connected with no ideas in her mind Until she was taught their significance they were unmeaning sounds

Her eyes were virtually for the first time opened upon the world Old things had passed away all things had become new Her parents brothers sisters friends were not recognized or acknowledged as such by her She had never seen them before—never known them—was not aware that such persons had been Now for the first time she was introduced to their company and acquaintance To the scenes by which she was surrounded she was a perfect stranger The house the fields the forest the hills the vales the streams—all were novelties The beauties of the landscape were all unexplored

She had not the slightest consciousness that she had ever existed previous to the moment in which she awoke from that mysterious slumber In a word she was an infant just born yet born in a state of maturity with a capacity for relishing the rich sublime luxuriant wonders of created nature

The first lesson in her education was to teach her by what ties she was bound to those by whom she was surrounded and the duties devolving upon her accordingly This she was very slow to learn and indeed never did learn or at last never would acknowledge the ties of consanguinity or scarcely those of friendship She considered those she had once known as for the most part strangers and enemies among whom he was by some remarkable and unaccountable means transplanted though from what region or state of existence was a problem unsolved

The next lesson was to re teach her the arts of reading and writing She was apt enough and made such rapid progress in both that *in a few weeks* she had readily re learned to read and write In copying her name which her brother had written for her as a first lesson she took her pen in a very awkward manner and began to copy from right to left in the Hebrew mode as though she had been transplanted from an Eastern soil

The next thing that is noteworthy is the change which took place in her disposition Instead of being melancholy she was now cheerful to extremity Instead of being reserved she was buoyant and social Formerly taciturn and retiring she was now merry and jocose Her disposition was totally and absolutely chan ed While she was in this second state extravagantly fond of company she was much more enamoured of nature s works as exhibited in the forests hills vales and water courses She used to start in the morning *either on foot or horseback and ramble until nightfall over the* whole country nor was she at all particular whether she were on a path or in the trackless forest Her predilection for this manner of life may have been occasioned by the restraint necessarily imposed upon her by her friends which caused her to consider them her enemies and not companions and she was glad to keep out of their way

She knew no fear and as bears and panthers were numerous in the woods and rattlesnakes and copperheads abounded everywhere her friends told her of the danger to which she exposed herself but it produced no other effect than to draw forth a contemptuous laugh as she said I know you only want to frighten me and keep me at home but you miss it for I often see your bears and I am perfectly convinced that they are nothing more than black hogs

One evening after her return from her daily excursion she told the following incident As I was riding to day along a narrow path a great black hog came out of the woods and stopped before me I never saw such an impudent black hog before It stood up on its hind feet and grinned and gnashed its teeth at me I could not make the horse go on I told him he was a fool to be frightened at a hog and tried to whip him past but he would not go and wanted to turn back I told the hog to get out of

terminology is known as a motor That is to say that whereas when awake she had thought in visual terms exclusively and could imagine things only by remembering how they *looked* now in this deeper trance her thoughts and memories seemed to M. Janet to be largely composed of images of movement and of touch

Having discovered this deeper trance and change of personality in Lucie M Janet naturally became eager to find it in his other subjects He found it in Rose in Marie and in Leonie and his brother Dr Jules Janet who was interne at the Salpetriere Hospital found it in the celebrated subject Wit who e trances had been studied for years by the various doctors of that institution without any of them having happened to awaken this very peculiar individuality

With the return of all the sensibilities in the deeper trance these subjects turned as it were into normal persons Their memories in particular grew more extensive, and hereupon M Janet pins a theoretic generalization *When a certain kind of sensation* he says *is abolished in an hysteric patient there is also abolished along with it all recollection of past sensations of that kind* If for example hearin be the anæsthetic sense the patient becomes unable even to imagine sounds and voices and has to speak (when speech is still possible) by means of motor or articulatory cues If the motor sense be abolished the patient must will the movements of his limbs by first defining them to his mind in visual terms and must innervate his voice by premonitory ideas of the way in which the words are going to sound. The practical consequences of this law ... belonging to a sphere of sensibility which

...

the course of disease Memory of them would be restored ... hand so soon as the sense of touch came back. Now in the hysteric subjects on whom M Janet experimented touch did come back in the state of trance The result was that all sorts of memories absent in the ordinary condition came back too and h ... could th n go back and explain the origin of many other wise inexplic...

hystero-epile...

tudes passio...

of herself w...

em ti nal st...

stereotyped as to ...

whether any consciousness exists whilst it lasts When however the patient Lucie s tactile sensibility came back in the deeper trance she explained the origin of her hysteric crisis in a great fright which she had had when a child on a day when certain men hid behind the curtains had jumped out upon her she told how she went through this scene again in all her crises she told of her sleep-walking fits through the house when a child and how for several months she had been shut in a dark room because of a disorder of the eyes All these were things of which she recollected nothing when awake because they were records of experiences mainly of motion and of touch

See the interesting account by M. J Janet in the *Revue scientifique*, May 9 888

that at a later period of her life she said she did sometimes seem to have a dim dreamy idea of a shadowy past which she could not fully grasp and could not be certain whether it originated in a partially restored memory or in the statements of the events by others during her abnormal state

Miss Reynolds died in January 1854 at the age of sixty one On the morning of the day of her death she rose in her usual health ate her breakfast and superintended household duties While thus employed she suddenly raised her hands to her head and exclaimed Oh! I wonder what is the matter with my head! and immediately fell to the floor When carried to a sofa she gasped once or twice and died

In such cases as the preceding in which the secondary character is superior to the first there seems reason to think that the first one is the morbid one The word *inhibition* describes its dulness and melancholy Felida X s original character was dull and melancholy in comparison with that which she later acquired and the change may be regarded as the removal of inhibitions which had maintained themselves from earlier years Such inhibitions we all know temporarily when we can not recollect or in some other way command our mental resources The systematized amnesias (losses of memory) of hypnotic subjects ordered to forget all nouns or all verbs or a particular letter of the alphabet or all that is relative to a certain person are inhibitions of the sort on a more extensive scale They sometimes occur spontaneously as symptoms of disease[1] Now M Pierre Janet has shown that such inhibitions when they bear on a certain class of sensations (making the subject anæsthetic thereto) and also on the memory of such sensations are the basis of changes of personality The anæsthetic and amnesic hysteric is one person but when you restore her inhibited sensibilities and memories by plunging her into the hypnotic trance—in other words when you rescue them from their dissociated and split off condition and make them rejoin the other sensibilities and memories—she is a different person As said above (p 132) the hypnotic trance is one method of restoring sensibility in hysterics But one day when the hysteric anæsthetic named Lucie was already in the hypnotic trance M Janet for a certain reason continued to make passes over her for a full half hour as if she were not already asleep The result was to throw her into a sort of syncope from which after half an hour she revived in a second somnambulic condition entirely unlike that which had characterized her thitherto—different sensibilities a different memory a different person in short In the waking state the poor young woman was anæsthetic all over nearly deaf and with a badly contracted field of vision Bad as it was however sight was her best sense and she used it as a guide in all her movements With her eyes bandaged she became entirely helpless and like other persons of a similar sort whose cases have been recorded she almost immediately fell asleep in consequence of the withdrawal of her last sensorial stimulus M Janet calls this waking or primary (one can hardly in such a connection say normal) state by the name of Lucie 1 In Lucie 2 her first sort of hypnotic trance the anæsthesias were diminished but not removed In the deeper trance Lucie 3 brought about as just described no trace of them remained Her sensibility became perfect and instead of being an extreme example of the visual type she was transformed into what in Prof Charcot s

[1] *Cf* Ribot *Diseases of Memory* for cases See also a large number of them in Forbes Winslow *Obscure Diseases of the Brain and Mind* chaps. xiii–xvii.

This resurrection f a somnambulic personage who had been extinct for twenty years is umous enough and in speaking t Leonie 3 I naturally now adop the name of Leo e which was gi en her by her first mas er

The most carefully studied case of multiple personality is that of the hysteric youth Louis V about whom MM Bourru and Burot have written a book. The symptoms are too intricate to be reproduced here with detail Suffice it that Louis V had led an irregular life in the army in hospital and in houses of correction and had had numerous hysteric anæsthesias, paralyses and contractures attacking him differently at different times and when he lived at different places. At eighteen at an agricultural House of Correction he was bitten by a iper which brought on a convulsive crisis and left *both of his le s* paralyzed for three years. *During this condition he was gentle moral* and industrious. But suddenly at last after a long convulsive seizure his paralysis disappeared and with it his memory for all the time during which it had endured. His character also chan ed he became quarrelsome glutton ous impolite stealing his comrades wine and money from an attendant and finally escaped from the establishment and fought furiously when he was over t k n and caught Later when he first fell under the observation of the authors l d his character intolerable

hospital of B cetre where he had been treated
His character opinions education ll underwent a concomitant transforma tion He was no longer the persona
lon that any present nervous disord
metals magnets electric or other baths etc, and ...
be brought back by hypnotic suggestion. He also went through a rapid spon taneous repetition of his series of past disorders after each of the convulsive at tacks which occurred in him at intervals It was observed that each physical state in which he found himself excluded certain memories and brought with it a definite modification of character

Th law f these c...res is quite clear There exist precise constant, and necessary relations between the bodily and the mental state, uch that it is impossible t modify the on without modifying the ther in a parallel fashi n.

The (
roborate
Coupling Jane s ...
personality we should ha e an apparent explanation of some cases at least of alternate personality But mere anæsthesia does not sufficiently explain the chan es of disposition which are probably due to modifications in the perviousness of motor and associative paths co-ordinate with those of the sensorial paths rather than consecuti e upon them And indeed a glance t other cases than M Janet s own, suffices to show us that sensibility and memory are not

... (Paris, 888)

But M Janet s subject Leonie is interesting and shows best how with the sensibilities and motor impulses the memories and character will chan e

This woman whose life sounds more like an improbable romance than a genuine history has had attacks of natural somnambulism since the age of three years She has been hypnotized constantly by all sorts of persons from the age of sixteen upwards and she is now forty five Whilst her normal life developed in one way in the midst of her poor country surroundings her second life was passed in drawing rooms and doctors offices and naturally took an entirely different direction To day when in her normal state this poor peasant woman is a serious and rather sad person calm and slow very mild with every one and extremely timid to look at her one would never suspect the personage which she contains But hardly is she put to sleep hypnotically when a metamorphosis occurs Her face is no longer the same She keeps her eyes closed it is true but the acuteness of her other senses supplies their place She is gay noisy restless sometimes insupportably so She remains good natured but has acquired a singular tendency to irony and sharp jesting Nothin is more curious than to hear her after a sitting when she has received a visit from strangers who wished to see her asleep She gives a word portrait of them apes their manners pretends to know their little ridiculous aspects and passions and for each invents a romance To this character must be added the possession of an enormous number of recollections whose existence she does not even suspect when awake for her amnesia is then complete She refuses the name of Leonie and takes that of Lé [illegible] (Lé [illegible]) to

[illegible]

ready long life To Léonie 1 [as M Janet calls the waking woman] on the other hand she exclusively ascribes the events lived throu h in waking hours I was at first struck by an important exception to the rule and was disposed to think that there might be somethin arbitrary in this partition of her recollections In the normal state Léonie has a husband and children but Leonie 2 the somnambulist whilst acknowledging the children as her own attributes the husband to the other This choice was perhaps explicable but it followed no rule It was not till later that I learned that her magnetizers in early days as audacious as certain hypnotizers of recent date had somnambulized her for her first *accouchements* and that she had lapsed into that state spontaneously in the later ones Leonie 2 was thus quite right in ascribing to herself the children—it was she who had had them and the rule that her first trance state forms a different personality was not brol en But it is the same with her second or deepest state of trance When after the renewed passes syncope etc she reaches the condition which I have called Leonie 3 she is another person still Serious and grave instead of being a restless child she speaks slowly and moves but little Again she separates herself from the waking Leonie 1 A good but rather stupid woman she says and not me And she also separates herself from Leonie 2 How can you see anything of me in that crazy creature? she says Fortunately I am nothing for her

Leonie 1 knows only of herself Léonie 2 of herself and of Leonie 1 Léonie 3 knows of herself and of both the others Leonie 1 has a visual consciousness Leonie 2 has one both visual and auditory in Leonie 3 it is at once visual auditory and tactile Prof Janet thought at first that he was Léonie 3 s discoverer But she told him that she had been frequently in that condition before A former magnetizer had hit upon her just as M Janet had in seel ing by means of passes to deepen the sleep of Leonie 2

they called in to see him But on telegraphing to Providence confirmatory messages came and p esently his n ph w M A drew Harris arri ed upon the scene made erything straight and took him home. H was ery weak having lost apparently o er twenty pounds f flesh during his escapade and h d such a horror of the idea of the candy store that I

The first two week
aft r h had ce res
who knew him seems
change i f course
Mr Bourne has
described by the nei
went to Philadelphi —
back shop, where he also slept we t egula ly to church an
ing made wh t w s co sidered by the hearers a good address in the course of which he rel t d an incide t which he had wi h n f r l state of Bourne

This was all that was kn wn of
B urn to submit to hyp tism
B own memory would not come
so indeed that t pr ed q te impos —
be any f the f cts f his n rmal life. He had hea d of An el Bourne but didn
kn w as h had e er m t the man. When confr ted w th Mrs Bourne he said that he had ne er een th w man befo e etc. On the other hand he told of his p regri nations during the lost f rtnight and ga e all sorts of d tails about the Norri town episode The whole thing was pr sa c e ough and the Brown perso al ty s ems t be thing but a athe shrunken, dej cted, and amnesic extract of Mr Bourne him elf He gi es moti e fo the wandering except that the e w s t o ble b ck th re and he wanted est D ring the trance he lo ks old the corne s of his mo th are drawn d wn, his e slow and weak and h s ts er ening his eyes a d try g ainly t emembr r what lay b fo e and after the two month of the B own experi ce. I'm all hed d in h s ys I an t get out at either end. I don t know what s t me down in that P wtuck t ho se-car a d I don t know how I ever left that sto e, or what became f rall ormal and all his sens bilities (sa e for ta die res
tion etc
b t n artifice
co s t o distin t pe onal sel es.

The ca e (wheth t c tain an epileptic element r not) h uld ppar tly be class d as e f p taneous hyp oti t anc pe sisting f tw months The pe uli arity f t is that thing el lik t ever curr d in the man life and that n eccen tricity of charact cam out In mo t imil r c es the att cks cur and the sensi bilities and d ct m kedly change.[2]

c) In *med umsh ps* or *possess ons'* the in 'as on and the pass n away of th secondary state are both relati ely abrupt and the duration of the state is

ar destr yed and th bo ding h use med by him has bee pull d d wn H f rg ts th name f th tw ladies h kept t.

[2] The details f th case t will be seen all *mpat bl* with simulati I can nly say I that, th t wh has examin d M B ur (incl ding D R d D Wei M tch ll D G y Hinsdale and M R Hodgso) p ctically d bts his ing ained h nesty so far as I can disco er do any of his personal cquaintances indulg in sceptical vi w

coupled in any invariable way[1] M Janet s law true of his own cases does not seem to hold good in all

arr

sup ... alternate action of the two hemispheres was long ago proposed by Dr Wigan in his book *The Duality of the Mind* I shall revert to this explanation after considering the third class of alterations of the Self those namely which I have called possessions

I have myself become quite recently acquainted with the subject of a case of alternate personality of the ambulatory sort who has given me permission to name him in these pages[2]

The Rev Ansel Bourne of Greene R I was brought up to the trade of a carpenter but in consequence of a sudden temporary loss of sight and hearing under very peculiar circumstances he became converted from Atheism to Christianity just before his thirtieth year and has since that time for the most part lived the life of an itinerant preacher He has been subject to headaches and temporary fits of depression of spirits during most of his life and has had a few fits of unconsciousness lasting an hour or less He also has a re ion of somewhat diminished cutaneous sensibility on the left thigh Otherwise his health is good and his muscular strength and endurance excellent He is of a firm and self reliant disposition a man whose yea is yea and his nay nay and his character for uprightness is such in the community that no person who knows him will for a moment admit the possibility of his case not being perfectly genuine

On January 17 1887 he drew $551 from a bank in Providence with which to pay for a certain lot of land in Greene paid certain bills and got into a Pawtucket hor e car This is the last incident which he remembers He did not return home that day and nothing was heard of him for two months He was published in the papers as missing and foul play being suspected the ...

... carried on his quiet trade without seemin to any one unnatural or eccentric ... and called in the people of the ... was Ansel Bourne that he was ... of shop keeping and that the ... ered—it seemed only yesterday—was drawing the money from the bank etc in Providence He would not believe that two months had elapsed The people of the house thought him insane and so at first did Dr Louis H Read whom

[1] His own b oth r s subj ct Wit ... although in her anæsthetic waking state she recollected nothing of either of her trances yet remembered he de per tran e (in which her sensib lit es bec me perfect—see above p 35) when she was in her l ghter trance Nevertheless in the latter she was as anæsth tic as when awake (*Loc cit* p 619)—It does not appear that ther was any important diffe ence in the sens b lity f Félida X b tween her two stat s—as far as one can judge fr m M Azam s ac ount she was to some degree anæsthetic in both (*op c t* pp 71 96) —In the case of double personality eported by M Dufay (*Revue sc ntifique* v l xviii p 69) the memory seems t have been b st in the mo e anæ thetic cond tion —Hypnot c su b ... lose the visual ideas ... and anæsthesias withou ... c subjects made blind b ... u that they cl arly m gi e the thi gs which they can no longer see

[2] A full account of the case by Mr R Hodgson w ll be fou d in the *P oce d gs of the Society for Psychical Research* for 1891

for many years been a writing subject and has a large collection of manuscript automatically produced

Some of it [he writes us] is in hieroglyph, or strange compounded arb trary char cters each series possessing seeming unity in general design or character followed

Many languages some obsole e and passed f om history are p ofessedly gi en. To see them would satisfy you that no o e could copy them except by tracing

These, however are but a small part of the phenomena. The utomatic has given pl to the *impress o al* and when the wo k is in progress I am in the normal con ditio and seemingly two mind intelligen es persons are practically engaged. The writing is in my own hand but the dictation not of my own mind and will but that of another upon ubjects of which I can have n knowledge and hardly a theory and I mys lf c nsciously criticise the thought f ct, mode of expressing it etc while the hand is rec ding the s bject m tter and even the words imp essed to be written If *I* refus to write the sentence, e en the word the imp ess on instantly ceases and my willingness mu t be mentally expressed before the work is resum d, and it is resumed at the point of cessatio e en if it sh uld be in the middle of a sentence. Sen ten es are mmen ed w hout knowledge of mine as to their subject or ending In f ct, I ha e never known in advance the subj ct of disquisiti n.

There is in p gress now t uncertain times not subj ct to my will a series of twenty four chapters upon the scientific features of life moral spiritual, eternal Seven ha e already been written in the manner indicated. These were preceded by twenty four hapters relating gen rally to the life bevo d material death, its charac teristics tc Each hapter is signed by th name of some person who has li ed on earth—som with wh m I ha e been perso ll d rs known in history it is completed and the reputed author ilosophy taught, of standpoint of life— w seems to be rea sonable, and is logically put. I co fess to an inability to su cessfully co tr vert it to my own satisf cti n.

uld be ar m e easonable and satisfa tory for m to accept the silly hypothesis of re incarnatio —the old doctrine f metempsychosis,—as taught by some spiritualists to-day and to believe that I li ed a f rm r life here, and that once in a while it dominates my intellectual powers and writes chapters upon the philosophy f life, o pens post-office f pirits to dr p their effusi ns, and ha e them p t int Engli h s ript. No the easiest and m st natural solution to me is to dmit the claim made e. that it is a decarnated intelligence who writes. But *who?* that is the q esti n The names of sch lars and thinkers wh nce li ed ar affixed to the most ungrammatical and weakest of b k

It seems reasonable to me—upon th hypothesis that t is person using another's mind brain—that th re must be m o less of that oth r s style r t ne in orporated in th messag and that to the unseen pers nality i.e. the power which im p esses the th ught, th f ct or the philosophy and not the style or tone, belongs.

usually short—i e from a few minutes to a few hours Whenever the secondary state is well developed no memory for aught that happened during it remains after the primary consciousness comes back The subject during the secondary consciousness speaks writes or acts as if animated by a foreign person and often names this foreign person and gives his history In old times the foreign control was usually a demon and is so now in communities which favor that belief With us he gives himself out at the worst for an Indian or other grotesquely speaking but harmless personage Usually he purports to be the spirit of a dead person known or unknown to those present and the subject is then what we call a medium Mediumistic possession in all its grades seems to form a perfectly natural special type of alternate personality and the susceptibility to it in some form is by no means an uncommon gift in persons who have no other obvious nervous anomaly The phenomena are very intricate and are only just beginning to be studied in a proper scientific way The lowest phase of mediumship is automatic writing and the lowest grade of that is where the Subject knows what words are coming but feels impelled to write them as if from without Then comes writing unconsciously even whilst engaged in reading or talk Inspirational speaking playing on musical instruments etc also belong to the relatively lower phases of possession in which the normal self is not excluded from conscious participation in the performance though their initiative seems to come from elsewhe... In the highest phase the trance is com...

changed and there is no after...

... One curious thing about trance-utterances is their generic similarity in different individuals The control here in America is either a grotesque slangy and flippant personage (Indian' controls calling the ladies squaws the men braves the house a wigwam etc etc are excessively common) or if he ventures on higher intellectual flights he abounds in a curiously vam...

... he subject assumes the role of a medium simply because opinion expects it of him under the conditions which are present and carries it out with a feebleness or a vivacity proportionate to his histrionic gifts But the odd thing is that persons unexposed to spiritualist traditions will so often act in the same way when they become entranced speak in the name of the departed go through the motions of their several death agonies send messages about their happy home in the summer land and describe the ailments of those present I have no theory to publish of these cases several of which I have personally seen

As an example of the automatic writing performances I will quote from an account of his own case kindly furnished me by Mr Sidney Dean of Warren R I member of Congress from Connecticut from 1855 to 1859 who has been all his life a robust and active journalist author and man of affairs He has

gently and faithfully t h r household duties as sting in the general wo k of the fam ly as a faithful prudent dau hter might be supposed to do singing reading or versing as opportunity ffered upon all matters of private or general interest to the family

The so-called Mary whilst at the Roffs would sometimes go back to heaven and leave the body in a quiet trance i e without the original personality of Lurancy returnin After eight or nine weeks however the memory and manner of Lurancy would sometimes partially but not entirely return for a few m nutes Once Lurancy seems to have taken full possession for a short time At last after some fourteen weeks conformably to the prophecy which Mary' had made when she first assumed control she departed definitively and the Lurancy consciousness came back for good Mr Roff writes

... hugging and kis ing each o e in tears of gl dness She lasped her arms ar und her f ther neck long time fairly smothering him with kisses I saw her f the just n w (el en o clock) He says she ha bee perfe tly nat ral and seems entirely well

Lurancy s mother writes a couple of months later that she was

perfectly and entirely ell and n tu l For t o or three weeks after her return home, sh seemed little st ang to what he had been before she was taken s ck last summer but nly pe haps the tural ch nge that had taken place with the girl and except it em d t he as though she had bee dreaming or sleep n etc. Lurancy has been smarter m intelligent mo industrious m e womanly and more pol te than befo e. We gi e the c edit f he ompl te ure and restor t on to he family to Dr E W St en and M and M s R ff by their obtaining her remo al to M Roff's where her cu e was perfected. W firmly believe that, had she remained at home, she w uld ha e died or we w uld ha e been obliged to send h r to the insane asylum and f so that he w uld hav died the e and further that I could not ha e li ed but a sh rt time w th the ca e and t uble dev l ing n me. S e al of the relati es f Lurancy incl ding urseI s now believe she was cured by pirit power and that Mary R ff c nt oll d the girl

E ght years later Lurancy was reported to be married and a mother and in good health She had apparently outgrown the mediumistic phase of her existence

On the condition of the sensibility during these invasions few observations have been made I have found the hands of two automatic writers anæsthetic during the act. In two others I have found this not to be the case Automatic writing is usually preceded by shootin pains along the arm nerves and irregular contractions of the arm muscles. I have found one medium s tongue and lips pparently insensible to pin pricks during her (peaking) trance

My friend Mr R Hodgs inf rms me that h visited W tseka in April 890 and cross-examined th principal tnesses f this case His nfiden in th rign l arr ti was strengthened by what h learned and anxious p blish d f cts w asc tained which incr ased th plausibility f th piritualistic interpretati f th phenomen n.

For instance while the influence is impressing my brain with the greatest force and rapidity so that my pencil fairly flies over the paper to record the thoughts I am conscious that in many cases the vehicle of the thought i e the language is very natural and familiar to me as if somehow *my* personality as a writer was getting mixed up with the message And again the style language everything is entirely foreign to my own style

I am myself persuaded by abundant acquaintance with the trances of one medium that the control may be altogether different from any *possible* waking self of the person In the case I have in mind it professes to be a certain departed French doctor and is I am convinced acquainted with facts about the circumstances and the living and dead relatives and acquaintances of numberless sitters whom the medium never met before and of whom she has never heard the names I record my bare opinion here unsupported by the evidence not of course in order to convert anyone to my view but because I am persuaded that a serious study of these trance phenomena is one of the greatest needs of psychology and think that my personal confession may possibly draw a reader or two into a field which the *soi disant* scientist usually refuses to explore

Many persons have found evidence conclusive to their minds that in some cases the control is really the departed spirit whom it pretends to be The phenomena shade off so gradually into cases where this is obviously absurd that the presumption (quite apart from *a priori* scientific ' prejudice) is great against its being true The case of Lurancy Vennum is perhaps as extreme a case of possession of the modern sort as one can find [1] Lurancy was a young girl of fourteen living with her parents at Watseka Ill who (after various distressing hysterical disorders and spontaneous trances during which she was possessed by departed spirits of a more or less grotesque sort) finally declared herself to be animated by the spirit of Mary Roff (a neighbor s daughter who had died in an insane asylum twelve years before) and insisted on being sent home to Mr Roff s house After a week of homesickness and importunity on her part her parents agreed and the Roffs who pitied her and who were spiritualists into the bargain took her in Once there he seems to have convinced the family that their dead Mary had exchanged habitations with Lurancy Lurancy was said to be temporarily in heaven and Mary s spirit now controlled her organism and lived again in her former earthly home

The girl now
person and eve
five years ago
of the family from 1852 to 1865 when Mary died calling attention to scores yes hundreds of incidents that transpired during her natural life During all the period of her sojourn at Mr Roff s she had no knowledge of and did not recognize any of Mr Vennum s family their friends or neighbors yet Mr and Mrs Vennum and their children visited her and Mr Roff s people she being introduced to them as to any strangers After frequent visits and hearing them often and favorably spoken of she learned to love them as acquaintances and visited them with Mrs Roff three times From day to day she appeared natural easy affable and industrious attending dili

[1] E W Stevens *The Watseka W nd r* Chicago Religio Philosoph cal Publishing House, 1887

cleus of the "*me*" is always the bodily existence felt to be present at the time. Whatever remembered-past feelings *resemble* this present feeling are deemed to belong to the same *me* with it. Whatever other things are perceived to be *associated* with this feeling are deemed to form part of that me's *experience*; and of them certain ones (which fluctuate more or less) are reckoned to be themselves *constituents* of the me in a larger sense,—such are the clothes, the material possessions, the friends, the honors and esteem which the person receives or may receive. This me is an empirical aggregate of things objectively known. The *I* which knows them cannot itself be an aggregate; neither for psychological purposes need it be considered to be an unchanging metaphysical entity like the Soul, or a principle like the pure Ego, viewed as 'out of time.' It is a *Thought*, at each moment different from that of the last moment, but *appropriative* of the latter, together with all that the latter called its own. All the experiential facts find their place in this description, unencumbered with any hypothesis save that of the existence of passing thoughts or states of mind. The same brain may subserve many conscious selves, either alternate or coexisting; but by what modifications in its action, or whether ultra-cerebral conditions may intervene, are questions which cannot now be answered.

If any one urge that I assign no *reason* why the successive passing thoughts should inherit each other's possessions, or why they and the brain-states should be functions (in the mathematical sense) of each other, I reply that the reason, if there be any, must lie where all real reasons lie, in the total sense or meaning of the world. If there be such a meaning, or any approach to it (as we are bound to trust there is), it alone can make clear to us why such finite human streams of thought are called into existence in such functional dependence upon brains. This is as much as to say that the special natural science of *psychology* must stop with the mere functional formula. *If the passing thought be the directly verifiable existent which no school has hitherto doubted it to be, then that thought is itself the thinker*, and psychology need not look beyond. The only pathway that I can discover for bringing in a more transcendental thinker would be to *deny* that we have any *direct* knowledge of the thought as such. The latter's existence would then be reduced to a *postulate*, an assertion that there *must be* a *knower* correlative to all this *known*; and the problem *who that knower is* would have become a metaphysical problem. With the question once stated in these terms, the spiritualist and transcendentalist solutions must be considered as *prima facie* on a par with our own psychological one, and discussed impartially. But that carries us beyond the psychological or naturalistic point of view.

If we speculate on the brain condition during all these different perversions of personality we see that it must be supposed capable of successively changing all its modes of action, and abandoning the use for the time being of whole sets of well organized association paths In no other way can we explain the loss of memory in passing from one alternating condition to another And not only this but we must admit that organized systems of paths can be thrown out of gear with others so that the processes in one system give rise to one consciousness and those of another system to another *simultaneously* existing consciousness Thus only can we understand the facts of automatic writing etc whilst the patient is out of trance and the false anæsthesias and amnesias of the hysteric type But just what sort of dissociation the phrase thrown out of gear may stand for we cannot even conjecture only I think we ought not to talk of the doubling of the self as if it consisted in the failure to combine on the part of certain systems of *ideas* which usually do so It is better to talk of *objects* usually combined and which are now divided between the two selves' in the hysteric and automatic cases in question Each of the selves is due to a system of cerebral paths acting by itself If the brain acted normally and the dissociated systems came together again we should get a new affection of consciousness in the form of a third Self different from the other two but knowing their objects together as the result —After all I have said in the last chapter this hardly needs further remark

Some peculiarities in the lower automatic performances suggest that the systems thrown out of gear with each other are contained one in the right and the other in the left hemisphere The subjects e g often write backwards or they transpose letters or they write mirror script All these are symptoms of agraphic disease The left hand if left to its natural impulse will in most people write mirror script more easily than natural script Mr F W H Myers has laid stress on these analogies[1] He has also called attention to the usual inferior moral tone of ordinary planchette writing On Hughlings Jackson s principles the left hemisphere being the more evolved organ at ordinary times inhibits the activity of the right one but Mr Myers suggests that during the automatic performances the usual inhibition may be removed and the right hemisphere set free to act all by itself This is very likely to some extent to be the case But the crude explanation of two selves by two hemispheres is of course far from Mr Myers s thought The selves may be more than two and the brain systems severally used for each must be conceived as interpenetrating each other in very minute ways

SUMMARY

To sum up now this long chapter The consciousness of Self involves a stream of thought each part of which as I can 1) remember those which went before and know the things they knew and 2) emphasize and care paramountly for certain ones among them as me and *appropriate to these* the rest The nu

[1] See his highly important series of articles on Automatic Writing etc in the *Proceedings of the Soc for Psych Research* especially Article II (May 1885) Compare also Dr Maudsley s instructive article in *Mind* vol xiv p 161 and Luys s essay Sur le Dédoublement etc. in *L Encéphale* for 1889

h cause to them as hu

mystery These writers have ... tive interest may by laying its weighty index finger on particular ... perience so accent them as to give to the least frequent associations far more power to shape our thought than the most frequent ones possess The interest itself though its genesis is doubtless perfectly *natural* *makes* experience more than it is made by it

Every one knows what attention is It is the taking possession by the mind in clear ... several simultaneously possible obje... its essence ... with others and is a condition which has a real opp... scatter brained state which in French is called *distraction* and *Zerstreutheit* in German

We all know this latter state even in its extreme degree Most people probably fall sever... thing like this The eyes are fixed on vacancy ... dispersed so ... of consciousness is filled if by anything by a sort of solemn sense ... to the empty passing of time. In the dim background of our mind we know meanwhile what we ought to be doing getting up dressing ourselves answering the person who has spoken to us trying to make the next step in our reasoning But somehow we cannot *start* the *pensée de derrière la tete* fails to pierce the shell of lethargy that wraps our state about Every moment we expect the spell to break for we know no reason why it should continue But it does continue pulse after pulse and we float with it until—also without reason that we can discover—an energy is given something—we know not what—enables us to gather ourselves together we wink our eyes we shake our heads the background ideas become effective and the wheels of life go round again

... tion can for a few moments be produced at will ... this is the most ... something like this scattered condition of mind to be the usual state of brutes when not actively engaged in some pursuit Fatigue monotonous mechanical ... being automatically carried on tend to produce it in ...

'Th first and m t important b t lso th m t difficult task at th tset f an ed ... ally perce... separately things which, if left to th msel es, w ld t b ttend d t b cause th y w uld fuse with ... fused t tal imp ...

Chapter XI

ATTENTION

STRANGE to say so patent a fact as the perpetual presence of selective attention has received hardly any notice from psychologists of the English empiricist school The Germans have explicitly treated of it either as a faculty or as a resultant but in the pages of such writers as Locke Hume Hartley, the Mills, and Spencer the word hardly occurs or if it does so it is parenthetically and as if by inadvertence [1] The motive of this ignoring of the phenomenon of attention is obvious enough These writers are bent on showing how the higher faculties of the mind are pure products of experience and experience is supposed to be

ing with the smoothness of the tale

But the moment one thinks of the matter one sees how false a notion of experience that is which would make it tantamount to the mere presence to the senses of an outward order Millions of items of the outward order are present to my senses which never properly enter into my experience Why? Because they have no *interest* for me *My experience is what I agree to attend to* Only those items which I *notice* shape my mind—without selective interest experience is an utter chaos Interest alone gives accent and emphasis light and shade background and foreground—intelligible perspective in a word It varies in every creature but without it the consciousness of every creature would be a gray chaotic indiscriminateness impossible for us even to conceive Such an empiricist writer as Mr Spencer for example regards the creature as absolutely passive clay upon which experience rains down The clay will be impressed most deeply where the drops fall thickest and so the final shape of the

reflected by the passive mirror which we call the sentient organism If such an account were true a race of dogs bred for generations say in the Vatican with characters of visual shape sculptured in marble presented to their eyes in every variety of form and combination ought to discriminate before long the finest shades of these peculiar characters In a word they ought to become if time were given accomplished *connoisseurs* of sculpture Anyone may judge of the probability of this consummation Surely an eternity of experience of the statues would leave the dog as inartistic as he was at first for the lack of an original interest to knit his discriminations on to Meanwhile the odors at the bases of the pedestals would have organized themselves in the consciousness of *this breed of dogs into a system of correspondences to which the most heredi*

[1] Bain mentio s attention in *The Senses and the I tellect* p 558 a d even gives a theory of it on pp 370–74 of *The Emotions and the Will* I shall recur to this theory later on

tary caste of *custodi* would never approximate merely because to them as hu man beings the dog s interest in those smells would for e er be an inscrutable mystery These writers have then utterly ignored the glaring fact that subjec tive interest may by layin its weighty index finger on particular items of ex perience so accent them as to give to the least frequent associations far more power to shape our thought than the most frequent ones possess The interest itself though its genesis is doubtless perfectly *natural makes* experience more than it is made by it.

E ery one knows what attention is. It is the takin possession by the mind in clear ... eem several simultaneously possible

obje

its es...

with others, and is a condition which has a real oppo...

scatter-brained state which in French is called *distraction* and *Zerstreutheit* in German.

We all know this latter state, even in its extreme degree Most people prob abl fall several times a day into a fit of somethin like this The eyes are fixed on vacancy the sounds of the world melt into confused unity the attention is dispersed so that the whole body is felt, as it were at once and the foreground of consciousness is filled if by anythin by a sort of solemn sense of surrender to the empty passing of time. In the dim background of our mind we know meanwhile what we ought to be doin getting up dressing ourselves answer ing the person who has spoken to us trying to make the next step in our reason ing But somehow we cannot *start* the *pensee de derr ere la tete* fails to pierce the shell of lethargy that wraps our state about. Every moment we expect the spell to break, for we know no reason why it should continue. But it does con tinue pulse after pulse and we float with it until—also without reason that we can discover—an energy is given something—we know not what—enables us to gather ourselves together we wink our eyes we shake our heads the back ground ideas become effective and the wheels of life go round again

This curious state of inhibition can for a few moments be produced at will b fixing the eyes on vacancy Some persons can voluntarily empty their minds and think of nothing With many as Professor Exner remarks of himself this is the most efficacious means of falling asleep It is difficult not to suppose somethin like this scattered condition of mind to be the usual state of brutes when not actively engaged in some pursuit. Fatigue monotonous mechanical occupations that end by being automatically carried on tend to produce it in men It is not sleep and yet when aroused from such a state a person will often hardly be able to say what he has been thinking about. Subjects of the hypnotic trance seem to lapse into it when left to themselves asked what they are think ing of they reply of nothing particular' 1

1 Th first and most important, b t also th most difficult, task t th tset f an edu catio is t ercom gradually th inattenti dispersion f mind which sh ws itself wherever the organic lif preponderates er th intellectual. Th training f animals must be in the first instance based on th wakenin f ttention (f Adrian Leonard *Essai sur l' ducation des animaux*, Lille, 842) that is to say we must seek to make them grad ally percei separately things which, if left to themselves, w uld n t be ttended to, because they w uld fuse with great sum f ther sensorial stimuli to confused t tal impression of

Chapter XI

ATTENTION

STRANGE to say so patent a fact as the perpetual presence of selective atten tion has received hardly any notice from psychologists of the English empiricist school The Germans have explicitly treated of it either as a faculty or as a re- sultant, but in the pages of such writers as Locke, Hume Hartley, the Mills and Spencer the word hardly occurs or if it does so, it is parenthetically and as if by inadvertence [1] The motive of this ignoring of the phenomenon of attention is obvious enough These writers are bent on showing how the higher faculties of the mind are pure products of experience ' and experience is supposed to be

I

ing with the smoothness of the tale

But the moment one thinks of the matter one sees how false a notion of ex perience that is which would make it tantamount to the mere presence to the senses of an outward order Millions of items of the outward order are present to my senses which never properly enter into my experience Why? Because they have no *interest* for me *My experience is what I agree to attend to* Only those items which I *notice* shape my mind—without selective interest experi ence is an utter chaos Interest alone gives accent and emphasis light and shade background and foreground—intelligible perspective in a word It varies in every creature but without it the consciousness of every creature would be a gray chaotic indiscriminateness impossible for us even to conceive Such an empiricist writer as Mr Spencer for example regards the creature as abso- lutely passive clay upon which experience rains down The clay will be im pressed most deeply where the drops fall thickest and so the final shape of the mind is moulded Give time enough and all sentient things ought at this rate to end by assuming an identical mental constitution—for experience the sole shaper is a constant fact and the order of its items must end by being *exactly* reflected by the passive mirror which we call the sentient organism If such an account were true a race of dogs bred for generations say in the Vatican with characters of visual shape sculptured in marble presented to their eyes in every variety of form and combination ought to discriminate before long the finest shades of these peculiar characters In a word they ought to become if time were given accomplished *connoisseurs* of sculpture Anyone may judge of the probability of this consummation Surely an eternity of experience of the statues would leave the dog as inartistic as he was at first for the lack of an original interest to knit his discriminations on to Meanwhile the odors at the bases of the pedestals would have organized themselves in the consciousness of this breed of dogs into a system of correspondences to which the most heredi

[1] Bain mentions attention in *The Se s s and the I t llect* p 558 d e en gi es a theory of it on pp 370–74 of *The Emotions and the Will* I shall recur to this theory later on.

again amplifies it to six. The opinion of the first and last of these philosophers [continues Sir Wm Hamilton] seems to me correct. You can easily make the experiments for yourselves but you must beware of grouping the objects into classes If you throw a handful of marbles on the floor you will find it difficult to view at once more than six, or seven at most without confusion but if you group them into twos or threes or fives you can comprehend as many groups as you can units because the mind considers these groups only as units—it views them as wholes, and throws their parts out of consideration.

Professor Jevons repeating this observation by counting instantaneously beans thrown into a box found that the number 6 was guessed correctly 120 times out of 147 5 correctly 102 times out of 107 and 4 and 3 always right It is obvious that such observations decide *nothing* at all about our attention properly so called They rather measure in part the distinctness of our vision—especially of the primary memory image—in part the amount *of association* in the individual between seen arrangements and the names of numbers

Each number name is a way of grasping the beans as one total object. In such a total object all the parts converge harmoniously to the one resultant concept no single bean has special discrepant associations of its own and so with *practice* they may grow quite numerous ere we fail to estimate them aright But where the object before us breaks into parts disconnected with each other and forming each as it were a separate object or system not conceivable in union with the rest it becomes harder to apprehend all these parts at once and the mind tends to let go of one whilst it attends to another Still within limits this can be done M Paulhan has experimented carefully on the matter by de-

Le t on M t physics lect xiv *h tur* l. iii, p 8 (87)

H l t f d ts st kes p f paper be exhib ted f m ment t person in *ormal* co diti with th req est that he say h w many re the h will find that they b ak int gr ps in his mind ye, and that whilst he is nalyzing and counting o group in his mem ry th thers dissol In sh rt, th impressi made by th d ts changes rapdly int m thing lse. I th *t ce bje t* th trary t seems to *tick* I find that persons in th hypn tic stat easily t th d ts in th mind ye so l g as th y d not m *ch exceed twenty in umber*

M Cattell mad Jev periment in m ch m p ecise w y (*Phil phisch Studie* iii, p ff) Cards wer ruled with sh rt line varying in umber f m f ur to fif en and exposed t *th* y *l* hundredth f sec d When th mb was b t f ur fi no mistakes as rul wer mad F higher umbe th t d ncy was t und rath than t -estimate Similar experime ts wer tried with lett rs and figur s, and g the same result. When th letters f rmed familia w ds three times as many f them could be named as wh their mbinatio as m ann less. If th w ds f rm d se t ce tw man f them uld be ca ght as wh they had connecti n. Th se t was then pp h ded as wh le If t ppreh ded thus lm t thing is pp e-h nded f th se ral w rds, b t if th sent ce as wh le is pp hended th th w ds ppear ry distinct —Wundt and his p pil Dietze had tried similar experime ts n rapidly repeated *tr k f sound.* Wundt mad th m f ll w each the in gro ps, and f und that gr ps f t l tr ke t m st uld be ecognized and de tified when th y succeeded h th t th m st f rabl rat nam ly f m th ee t fi t *ths f* seco d (*Phy P ych* ii p 5) D tze f und that by mentall bdi iding th gr ps t b-gr ps as one lis ened as ma y as f ty tr kes uld be d tified as wh le. Th y were then gra ped as eight sub-gro ps f fi e, as fi f ei ht trokes each. (*Philo phisch St di* ii, p 36)—Later in Wundt laborat ry Becht rew mad bservati ns n tw *simult usly* lapsing series f m t me str kes, f which tain d tr k m re tha th ther Th most f rable rat f essi was 3 sec d h th discriminated gr p of 8 f m one of 8+ pparently (*W ur log ch Cent alblatt* [889] p. 7)

The abolition of this condition is what we call the awakening of the attention One principal object comes then into the focus of consciousness others are temporarily suppressed The awal ening may come about either by reason of a stimulus from without or in consequence of some unknown inner alteration and the change it brings with it amounts to a concentration upon one single object with exclusion of aught besides or to a condition anywhere between this and the completely dispersed state

To How Many Things Can We Attend at Once?

The question of *the span of consciousness* has often been asked and answered—sometimes *a priori* sometimes by experiment This seem th n place for us to touch upon it
down in Chapter IX will not b
to is altogether indefinite dep on the power of the individual intellect on the form of the apprehension and on what the things are When apprehended conceptually as a connected system their number may be very large But however numerous the things they can only be known in a single pulse of consciousness for which they form one complex object (p 179 ff) so that properly speaking there is before the mind at no time a plurality of *ideas* properly so called

The unity of the soul has been supposed by many philosophers who also believed in the distinct atomic nature of ideas to preclude the presence to it of more than one objective fact manifested in one idea at a time Even Dugald Stuart opines that every *minimum visible* of a pictured figure

> constitutes just as distinct an object of attention to the mind as if it were separated by an int n l est It is impossible for the mind to once and as the perception of the figure on of the different points with respect to each other we must conclude that the perception of figure by the eye is the result of a number of different acts of attention These acts of attention however are performed with such rapidity that the effect, with respect to us is the same as if the perception were instantaneous [1]

Such glaringly artificial views can only come from fantastic metaphysics or from the ambiguity of the word idea which standing sometimes for mental state and sometimes for thing known leads men to ascribe to the thing not only the unity which belongs to the mental state but even the simplicity which is thought to reside in the Soul

When the things are apprehended by the *senses* the number of them that can be attended to at once is small *Pluribus intentus minor est ad singula sensus*

By Charles Bonnet the Mind is allowed to have a distinct notion of six objects at once by Abraham Tucker the number is limited to four while Destutt de Tracy

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wh ch each separate tem only darkens and interferes w th the rest. S m larly t first with the human child The en rmous difficulties of deaf mute and especially of id ot inst uction is principally due to the slow and painful ma ne in which we s cceed in b ing g out f om the general confusion of perception single items with sufficient sharpness. (Waitz *Lehrb d Psychol* p 632)

[1] *Elements* pt I chap II *fin*

for a moment and to appear subsequent although in reality the two may have been contemporaneous events Thus to use the stock example of the books the surgeon would sometimes see the blood flow from the arm of the patient whom he was bleeding *before* he saw the instrument penetrate the skin Similarly the smith may see the parks fly *before* he ees the hammer smite the iron etc There is thus a certain difficulty in perceiving the exact *date* of two impres sions when they do not interest our attention equally and when they are of a di parate sort

on the *minimal perceptible succession*

catch the i h de of the nsd

in small

cessi e a

The first way of attending

—when e g they were similar sounds heard each

always be known by default was often not clearly distinguish

the time was too short the first could not be isolated from the second at all

The second way was to accommodate the attention for a certain *sort* of sig nal and the ext moment to become aware in memory of whether it came be fore or after its mate

This way brings great uncertainty with it. The imp ession not prepared for comes to in th memory mo weak th th oth r ob cur as t we e b dly fixed time. We te d to take the bject ely tro ger stimul s th t which we we e intent upon fo the first, just as we a e apt to take an *objecti ely stronger stimulus to* be the first Still t may happen otherwise. In the experiments from touch to s ght it often *seemed to me as if the mp ess fo which the attention was not p epa ed* were there already when the other came.

Exner found himself employing this method oftenest when the impressions differed stron ly

In such observations (wh ch must not be confounded with those where the two s gnals were ident cal and their successiveness known as mere *double ess* without distinction of h ch came fir t) it is obvious that each signal must combine stably in our pe cept on w th a *d ffe ent* instant of time It *is the sim* plest poss ble case of two discrepant concepts simultaneously occupyin the

Chapter III It happened occasionally in Wundt s experiments that the reac t o time was reduced to zero or e en assumed a negative value which being translated nto common peech means that the observer was somet mes so in tent upon the s gnal that his reaction *actually coinc ded in t me u th it or even p ceded it* instead of coming a fraction of a second after it as in the nature of things t should More will be said of these results anon Meanwhile Wundt in explaining them says this

Pfl g r Archiv xi, pp 4 9-31

claiming one poem aloud whilst he repeated a different one mentally, or by writing one sentence whilst speaking another or by performing calculations on paper whilst reciting poetry [1] He found that

> the most favorable condition for the doubling of the mind was its simultaneous application to two easy and heterogeneous operations Two operations of the same sort two multiplications two recitations or the reciting one poem and writing another render the process more uncertain and difficult

The attention often but not always oscillates during these performances and sometimes a word from one part of the task slips into another I myself find when I try to simultaneously recite one thing and write another that the beginning of each word or segment of a phrase is what requires the attention Once started my pen runs on for a word or two as if by its own momentum M Paulhan compared the time occupied by the same two operations done simultaneously or in succession and found that there was often a considerable gain of time from doing them simultaneously For instance

> I write the first four verses of *Athalie* whilst reciting eleven of Musset The whole performance occupies 40 seconds But reciting alone takes 22 and writing alone 31 or 53 altogether so that there is a difference in favor of the simultaneous operations.

Or again

> I multiply 421 312 212 by 2 the operation takes 6 seconds the recitation of 4 verses also takes 6 seconds But the two operations done at once only take 6 seconds so that there is no loss of time from combining them

Of course these time measurements lack precision With three systems of object (writing with *each* hand whilst reciting) the operation became much more difficult

If then by the original question how many ideas or things can we attend to at once be meant how many entirely disconnected systems or processes of conception can go on simultaneously the answer is *not easily more than one unless the processes are very habitual but then two or even three* without very much oscillation of the attention Where however the processes are less automatic as in the story of Julius Cæsar dictating four letters whilst he writes a fifth [2] there must be a rapid oscillation of the mind from one to the next and no consequent gain of time Within any one of the systems the parts may be numberless but we attend to them collectively when we conceive the whole which they form

When the things to be attended to are small sensations and when the effort is to be exact in noting them it is found that attention to one interferes a good deal with the perception of the other A good deal of fine work has been done in this field of which I must give some account

It has long been noticed when expectant attention is concentrated upon one of two sensations that the other one is apt to be displaced from consciousness

[1] *Revue scientifique* vol 39 p 684 (May 28 1887)

[2] *Cf* Chr Wolff *Psychologia Empirica* § 245 Wolff's account of the phenomena of attention is in general excellent

and that a single revolution of the latter is never enough for the purpose. The motion must go on long enough for the sounds themse ... r series—the out c me being a simultaneous percepti n f two ... its rapidity modify the re.

of ttention ha e a great influence ... a b trarily ch sen pos tion f the index, we succeed w th ut ... If again we co er the

the law of great numbers and allow in ... ments extend over many years (with int rruptions) they are not even yet num rous enough to exhaust the s bject—still they bring o t the principal laws which the at tenti n follows under s ch conditions

Wundt accordingly distinguishes the *direction* from the *amount* of the apparent displacement in time of the bell stroke The direction depends on the rapidity of the movement of the index and (consequently) on that of the succession of the bell strokes The moment at which the bell struck was estimated by him with the least tendency to error when the revolutions took place once in a second Faster than this *positi e* errors began to prevail slower *negati e* ones almost always were present On the other hand if the rapidity went *quickening* errors became *egat e* if *slowi g pos t ve* The amount of error is in general the greater the slower the speed and its alterations Finally individual differences prevail as well as differences in the same individual at different times [1]

[1] *Ph l Psy k* d ed pp. 264–66

This was th riginal "personal equati n bservati n f Bessel. An bserver l ked thr gh his equat rial t lesc pe t t th m ment t which a tar crossed th m ridian, th latter being marked in th t lesc pe field f view by isibl thread, besid which ther

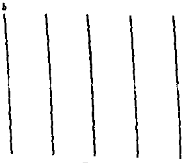


FIG 35

In general *we have a very exact feeling of the simultaneity of two stimuli* if they do not differ much in strength And in a series of experiments in which a warning precedes, at a fixed interval the stimulus we involuntarily try to react not only as promptly as possible but also in such wise that our movement may coincide with the stimulus itself We seek to make our own feelings of touch and innervation [muscular contraction] objectively *contemporaneous with the signal* which we hear and experience shows that in many cases we approximately succeed In these cases we have a distinct consciousness of hearing the signal reacting upon it and feeling our reaction take place —all at one and the same moment [1]

In another place Wundt adds

The difficulty of these observations and the comparative infrequency with which the reaction time can be made thus to disappear shows how hard it is when our attention is intense to keep it fixed even on *two* different ideas at once Note besides that when this happens one always tries to bring the ideas into a certain connection to grasp them as components of a certain complex representation Thus in the experiments in question it has often seemed to me that I produced by my own recording movement the sound which the ball made in dropping on the board [2]

The difficulty in the cases of which Wundt speaks is that of forcing two non simultaneous events into apparent combination with the same instant of time There is no difficulty as he admits in so dividing our attention between two *really* simultaneous impressions as to feel them to be such The cases he describes are really cases of anachronistic perception of subjective time displacement to use his own term Still more curious cases of it have been most carefully studied by him They carry us a step farther in our research so I will quote them using as far as possible his exact words

The conditions become more complicated when we receive a series of impressions separated by distinct intervals into the midst of which a heterogeneous impression is suddenly brought Then comes the question with which member of the series do we perceive the additional impression to coincide? With that member with whose pres

easily get from a moving object) for the series and with a sound as the disparate impression Let e g an index hand move over a circular scale with uniform and sufficiently slow velocity so that the impressions it gives will not fuse but permit its position at any instant to be distinctly seen Let the clockwork which turns it have an arrangement which rings a bell once in every revolution but at a point which can be varied so that the observer need never know in advance just when the bell stroke takes place. In such observations three cases are possible The bell stroke can be perceived either exactly at the moment to which the index points when it sounds—in this

this we will call a *negative displacement* The most natural displacement would ap-

It should be observed that in all these experiments it takes some time to get a distinctly perceived combination of the sound with a particular position of the index,

[1] *Phys ol Psych* 2d ed. II pp 238–40 [2] *Ibid* p 262

This is all I have to say about the difficulty of having two discrepant concepts together and about the number of things to which we can simultaneously attend

The Varieties of Attention

A *te est* us Our interest in them is

tion Meanwhile

Attention may be divided into kinds in various ways It is either to

a) Objects of sense (sensorial attention) or to

b) Ideal or represented objects (intellectual attention) It is either

c) Immediate or

wh *the topic* or stimulus is interesting in itself

e ther

e) Passi e reflex non voluntary effortless or

f) Acti e and voluntary

Vol ntary attention is always derived we never make an *effort* to attend to an object except *for the sake of some remote interest wh ch the effort will serve* But both sensorial and intellectual attention may be either passive or voluntary

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th ind t th ry inst t that w tch th m mentary imp essio w fall int w y f fixing t eith t th last p ssibl m m t b fore t th first p ssibl m m t alt r

mplex? A d hy und rtain co diti ns is th d.pl cem t t ans er which ggests tself is th t wh th is just en gh l ur betw en th imp essions f r the it *t d t t M mf rtably* both t th m and t th ind (se d in W perim

h th l is ins ffici t th m m tary mpressi ns, being th m fix d data ar

al b ll- *k ll rr d* I d bt wh th this is p ssibl and I ca think f anal gu t t in th rest f experie Th wh l bject deserves t b g er gain. T Wundt is d th highest credit f his p ti in w king t th fa ts His explan ti n f th m in hi th k (*Vorlesu g b M ns h nd Thier l* pp 37 4 365 7) nsist d merely in th ppeal to th unity f nsci usness, and may be nsidered quit crude.

Wundt s pupil von Tschisch has carried out these experiments on a still more elaborate scale[1] using not only the single bell stroke, but 2 3, 4, or 5 simultaneous impressions so that the attention had to note the place of the index at the moment when a whole group of things was happening The sin le bell stroke was always heard too early by von Tschisch—the displacement was invariably negative As the other simultaneous impressions were added the displacement first became zero and finally positive i e the impressions were connected with a position of the index that was too late This retardation was greater when the simultaneous impressions were disparate (electric tactile stimuli on different places simple touch stimuli different sounds) than when they were all of the same sort The increment of retardation became relatively less with each additional impression so that it is probable that six impressions would have given almost the same result as five which was the maximum number used by Herr von T

Wundt explains all these results by his previous observation that a reaction sometimes antedates the signal (see above p 266) The mind he supposes is so intent upon the bell strokes that its apperception keeps ripening periodically after each stroke in anticipation of the next Its most natural rate of ripening may be faster or slower than the rate at which the strokes come If faster then it hears the stroke too early if slower it hears it too late The position of the index on the scale meanwhile is noted at the moment early or late at which the bell stroke is subject ...

... ınıscn give[2]

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and to div de the time as the me id an line seemed to divide the space If e g one had counted 20 seconds and at the 21st the star seemed removed by *ac* from the meridian thread *c* whilst at the 22d it was at the d stance *bc* then if *ac* *bc* 1 2 the star would have pass d at 21⅓ seconds The cond tions resemble those in our xperiment the star is the index hand the threads a e the scale and a time d splacement is to be expected which with high rapid ties may be positi e and negative with low The astronomic obser ati ns do not permit us to measure its absolute amount but that it e ists is made certain by the fact that after all other possible errors are el m n ted ther still rema ns between differ nt observers a personal difference whi h is often much larger than that betw en mere reaction times amount ng sometimes to more than a second (*Op c t* p 270)

[1] *Philosoph sche Stud* n II p 601

[2] *Phys l Psych* 2d ed II pp 273–74 3d ed II p 339 *Phil sopl ch Stud* II p 621 ff —I know that I m stupid but I confess I find these th retical stat ments especially Wundt s a l ttle h y H r v Tsch s h ...

1 ... m ... eous momentary sens tions The b ll or other s gnal gives a momentary ensati n the inde a co t uous ne of m ti n To note a y one *pos t o* of the latter is to *te upt* this sensati n of m tion and to substitute n entirely different pe cept—one n mely of n s t n— ... ow ... br f This is ... is of the nd x wh ch ... ry imp ession and fix ... ply getting tw sensa ... but of *stoppi g o* ... Two f these acts re discrepant and the whole th e rather ... f re w th each other It b comes h rd t fix

laxed, a buzzing murmur was always to be heard, which invariably stopped for as long a time as an anecdote lasted. How could the boys since they seemed to hear noth g notice when the anecdote began? Doubtless most of them always heard
 ... h d n connection with their p evious
sor
kn
co
w
imp es ... — —
which dro e the grant deas below the threshold of consciousness ...
while settled attenti into their pl ce [1]

Passi e intellectual attent on is immediate when we follow in thought a train of images exciting or interesting *per se* derived when the images are interest in only as means to a *remote end* or *merely* because they are associated with somethin, which makes them dear Owing to the way in which immense numbers of real things become integrated into single objects of thought for us there is no clear line to be drawn between immediate and derived attention of an intellectual sort When absorbed in intellectual attention we may become so inattenti e to outer things as to be absent minded abstracted or *dis tra ts* All revery or concentrated meditation is apt to throw us into this state.

Ar himedes t is well known was so abso bed in geometrical meditation that he was first ware f the st rming of Syracuse by his own death wound and his exclama tio o the entrance of the Roman soldiers was *Nol turbare circulos meos!* In like manne Joseph Scaliger the most learn d of men when a Protestant student in Paris, was so rr ved the tudy of Hom r that he became aware of the massacre of St. Barth
Th
th t

both his way and the object f his j urney T the questi ns of his driver whether he sh uld p o eed he made o answer and when he came to himself at nightfall he was urprised t find the carriage at tandstill and directly under a gall ws. The mathematician V et was sometimes so buried in meditati n that f hours he bo more esemblan e to dead person than to a li ing, and was then wholly un onscious of e erything g ing ar und him. On the day f his marriage th great B dæus f got everything in his phil l gical peculations and h was nly awakened to th ffairs of the external w ld by tardy embassy f om the marriage-party who f und him abso bed in the compositio f his C *mmentarii*

The absorption may be so deep as not only to banish ordinary sensations but e en the seve est pain Pascal Wesley Robert Hall are said to have had this capacity Dr Carpenter says of himself that

found himself ontinuously borne along without the least distracti n, until the end has ome and the tention has been released when the pain has recurred with a

Herbart *Psy hologie als Wissenschaft* § 8.
Sir W Hamil *M physics* lecture xiv

In *passive immediate sensorial attention* the stimulus is a sense-impression, either very intense, voluminous or sudden —in which case it makes no difference what its nature may be whether sight sound smell blow or inner pain —or else it is an *instinctive* stimulus a perception which by reason of its nature rather than its mere force appeals to some one of our normal congenital impulses and has a directly exciting quality In the chapter on Instinct we shall see how these stimuli differ from one animal to another and what most of them are in man strange things moving things wild animals bright things, pretty things metallic things words blows blood etc etc etc

Sensitiveness to immediately exciting sensorial stimuli characterizes the attention of childhood and youth In mature age we have generally selected those stimuli which are connected with one or more so called permanent interests and our attention has grown irresponsive to the rest [1] But childhood is characterized by great active energy and has few organized interests by which to meet new impressions and decide whether they are worthy of notice or not and the consequence is that extreme mobility of the attention with which we are all familiar in children and which makes their first lessons such rough affairs Any strong sensation whatever produces accommodation of the organs which perceive it and absolute oblivion for the time being of the task in hand This reflex and passive character of the attention which as a French writer says makes the child seem to belong less to himself than to every object which happens to catch his notice is the first thing which the teacher must overcome It never is overcome in some people whose work to the end of life gets done in the interstices of their mind wandering

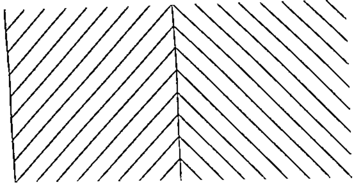
The passive sensorial attention is *derived* when the impression without being either strong or of an instinctively exciting nature is connected by previous experience and education with things that are so These things may be called the *motives* of the attention The impression draws an interest from them or perhaps it even fuses into a single complex object with them the result is that it is brought into the focus of the mind A faint tap *per se* is not an interesting sound it may well escape being discriminated from the general rumor of the world But when it is a signal as that of a lover on the window pane it will hardly go unperceived Herbart writes

> How a bit of bad grammar wounds the ear of the purist! How a false note hurts the musician! or an offence against good manners the man of the world! How rapid is progress in a science when its first principles have been so well impressed upon us that we reproduce them mentally with perfect distinctness and ease! How slow and uncertain on the other hand is our learning of the principles themselves when familiarity with the still more elementary percepts connected with the subject has not given us an adequate predisposition!—Apperceptive attention may be plainly observed in very small children when hearing the speech of their elders as yet unintelligible to them they suddenly catch a single known word here and there and repeat it to themselves yes! even in the dog who looks round at us when we speak of him and pronounce his name. Not far removed is the talent which mind wandering school boys display during the hours of instruction of noticing every moment in which the teacher tells a story I remember classes in which instruction being uninteresting and discipline re-

[1] Note that the permanent interests are themselves grounded in certain objects and relations in which our interest is immediate and instinctive

life Nature rises at such suggestions and excludes them from the view —How long O healthy reader can you now continue thinking of your tomb?—In milder instances the difficulty is as great especially when the brain is fagged One snatches at any and every passing pretext no matter how trivial or external to escape from the odiousness of the matter in hand I know a person for example who will poke the fire set chairs straight pick dust specks from the floor arrange his table snatch up the newspaper take down any book which catches his eye trim his nails waste the morning *anyhow* in short and all without premeditation —simply because the only thing he *ought* to attend to is the preparation of a noonday lesson in formal logic which he detests Any thin but *that!*

Once more the object must change When it is one of s ht it will actually become invis ble when of hearing inaudible —if we attend to it too unmovingly Helmholtz who has put his sensorial attention to the severest tests by using his eyes on objects which in common life are expressly overlooked makes



F G 36

some interesting remarks on this point in his chapter on retinal rivalry The phenomenon called by that name is this that if we look with each eye upon a different p cture (as in the annexed stereoscopic sl de) sometimes one picture sometimes the other or parts of both will come to consciousness but hardly ever both combined Helmholtz now says

I fi d that I am bl t attend voluntarily n w to o e and now to the other system of lines d that then thi y tem remains visible alone for a certain time whilst the othe compl tely vanishes Thi h ppens f exampl wh I try to unt the lines first of o e and then of the ther system. But it is extremely h rd to chain th ttent d n to o of the y tem f l g unl we ass ciat w th u l k ing som di tinct p rpose which keeps the activ ty of the attent on p rpetually e newed Such e is unting th lin c mparing thei intervals or th like. An equilibrium of the ttention pe sistent for any length f time is und r no cir um tan es attainable The natural te dency f attention whe l ft to itself is to wander to w thing and so so as the inte e t of ts bject is so soo as nothing ew s t be uc d th t passes in p te of ur will to som thing else. If we w sh t keep t po and the sam object w must seek nstantly to find out s mething new abo t th latte especially if other pow ful imp essions ar ttr cting us aw y

Phy logisch Op ik § 3

force that has overmastered all resistance making him wonder how he could have ever ceased to feel it [1]

Dr Carpenter speaks of launching himself by a determined *effort* This effort characterizes what we called *active or voluntary attention* It is a feeling which every one knows but which most people would call quite indescribable We get it in the sensorial sphere whenever we seek to catch an impression of extreme *faintness* be it of sight hearing taste smell or touch we get it whenever we seek to *discriminate* a sensation merged in a mass of others that are similar we get it whenever we *resist the attractions* of more potent stimuli and keep our mind occupied with some object that is naturally unimpressive We get it in the intellectual sphere under exactly similar conditions as when we strive to sharpen and mal e distinct an idea which we but vaguely seem to have or pain fully discriminate a shade of meaning from its similars or resolutely hold fast to a thought so discordant with our impulses that if left unaided it would

dinner party resolutely to listen to a neighbor giving him insipid and unwel come advice in a low voice whilst all around the guests were loudly laughing and talking about exciting and interesting things

There is no such thing as voluntary attention sustained for more than a few seconds at a time What is called sustained voluntary attention is a repetition of successive efforts which bring back the topic to the mind [2] The topic once brought back if a congenial one *develops* and if its development is interesting it engages the attention passively for a time Dr Carpenter a moment back described the stream of thought once entered as bearing him along This passive interest may be short or long As soon as it flags the attention is di verted by some irrelevant thing and then a voluntary effort may bring it back to the topic again and so on under favorable conditions for hours together During all this time however note that it is not an identical *object* in the psy chological sense (p 178) but a succession of mutually related objects forming an identical *topic* only upon which the attention is fixed *No one can possibly attend continuously to an object that does not change*

Now there are always some objects that for the time being *will not develop* They simply *go out* and to keep the mind upon anything related to them re quires such incessantly renewed effort that the most resolute Will ere long gives out and lets its thoughts follow the more stimulating solicitations after it has withstood them for what length of time it can There are topics known to every man from which he shies like a frightened horse and which to get a glimpse of is to [illegible] ebbing assets to the spendthrift in full career But why sing

of [illegible]

stay before the mind? It is like *memento mori* in the heyday of the pride of

[1] *Mental Phys ol* § 124 The oft c ted case of soldiers not perceiving that they are

xi, p 240)

ov   d   er again is the very root of judgment character and will No one
is   h h should improve this faculty
wi
t
i

sible awaken curiosity so that the ne
or part of an answer to a question pre-existing in his mind

At present having described the varieties let us turn to

The Effects of Attention

Its re
theoreti
selectio
xiv and
that each of us literally *chooses* by his ways of attending to thing
of a universe he shall appear to himself to inhabit

The immediate effects of attention are to make us

a) pe ce ve—
b) conceive—
c) distinguish—
d) emember—

better than otherwise we could—both more successive things and each thing more clearly It also

e) shortens reaction time

a) and *b*) Most people would say that a sensation attended to becomes st onger than it otherwise would be This point is however not quite plain and has occasioned some discussion From the strength or intens ty of a sen sat on must be distinguished its clearness and to increase *this* is for some psy chologists the utmost that attention can d When the facts are surveyed how e   t m t h   dmitted that to some extent the relative intensity of two sensa
1

to e the red color start out of everything if for cold the blue Similarly in

S   g Ul a Le b S l n p 3 L tz M t phy k § 73 F chn   R   d
P y h phy k   ix G E Mulle Z Th   te d n nl A fmerk mk t §   Stumpf To
p y k l g   p 7

And again criticising an author who had treated of attention as an activity absolutely subject to the conscious will Helmholtz writes

> This is only restrictedly true We move our eyes by our will but one without training cannot so easily execute the intention of making them converge At any moment however he can execute that of looking at a near object in which act convergence is involved Now just as little can we carry out our purpose to keep our attention steadily fixed upon a certain object when our interest in the object is exhausted and the purpose is inwardly formulated in this abstract way *But we can set oursel es new questions about the object so that a new interest in it arises and then the attention will remain riveted* The relation of attention to will is then less one of immediate than of mediate control

These words of Helmholtz are of fundamental importance And if true of sensorial attention how much more true are they of the intellectual variety! The *conditio sine qua non* of sustained attention to a given topic of thought is that we should roll it over and over incessantly and consider different aspects and relations of it in turn Only in pathological states will a fixed and ever monotonously recurring idea possess the mind

And now we can see why it is that what is called sustained attention is the easier the richer in acquisitions and the fresher and more original the mind In such minds subjects bud and sprout and grow At every moment they please by a new consequence and rivet the attention afresh But an intellect unfurnished with materials stagnant unoriginal will hardly be likely to consider any subject long A glance exhausts its possibilities of interest Geniuses are commonly believed to excel other men in their power of sustained attention[1] In most of them it is to be feared the so called power is of the passive sort Their ideas coruscate every subject branches infinitely before their fertile minds and so for hours they may be rapt *But it is their genius making them attentive not their attention making geniuses of them* And when we come down to the root of the matter we see that they differ from ordinary men less in the character of their attention than in the nature of the objects upon which it is successively bestowed In the genius these form a concatenated series suggesting each other mutually by some rational law Therefore we call the attention sustained and the topic of meditation for hours the same In the common man the series is for the most part incoherent the objects have no rational bond and we call the attention wandering and unfixed

It is probable that genius tends actually to prevent a man from acquiring habits of voluntary attention and that moderate intellectual endowments are the soil in which we may best expect here as elsewhere the virtues of the will strictly so called to thrive But whether the attention come by grace of genius or by dint of will the longer one does attend to a topic the more mastery of it one has And the faculty of voluntarily bringing back a wandering attention

1 Genius says Helvetius is nothing but a continued attention (*u e att nt on s i e*) Genius says Buffon is nly a protracted pati nce (*e long e pat e ce*) In the exact scie ces at least says Cuv er it is the patie ce of a s und i t llect when inv ncible which truly constitutes genius And Chesterfeld has also observed that tl e p wer of applying an attention ste dy and undissip ted to a single object is the sure mark of a sup rior genius. (Hamilton *Lectures on Metaph* lecture xiv)

d) Whatever future conclusion we ma
an object once attended to will remain s
allowed to pass will leave no traces behi
ff) we discussed whether certain states of mind w
whether they were not rather states to which no attention had been paid and of whose passage recollection could afterwards find no vestiges. Dugald Stewart says The connection between attention and memory has been remarked by many authors. He quotes Quintilian Locke and Helvetius and goes on at great length to explain the phenomena of secondary automatism (see above p 74 ff) by the presence of a mental action grown so inattentive as to preserve no memory of itself In our chapter on Memory later on the point will come up again

e) Under this head the *shortening of reaction time* there is a good deal to be said of Attention s effects. Since Wundt has probably worked over the subject more thoroughly than any other investigator and made it peculiarly his own, what follows had better as far as possible be in his words The reader will remember the method and results of experimentation on reaction time, as gi en in Chapter III

The facts I proceed to quote may also be taken as a supplement to that chapter Wundt writes

When we wait with strained attention for a stimulus, it will often happen that instead of registeri... the stimulus we react upon some entirely different impres on — and this n t through c founding the o e with the other O the co trary we are perfectly well aware at the moment f making the mo ement that we respond to the wrong stimulus. Som times even though t so often the latter may be another kind of sensation alt ether — o e may for exampl in experimentin with sound, regi ter ... n oduced either by accident or design. W cannot well explain these

...

discharge. This shock may be given by any chance impres on even by one to which we ever intended to espo d. When th p eparatory innervation has once reached this pitch of intensity the time that intervenes between the stimulus and the contrac t on f the mus les which ea t may becom ...ly small.

The percepti f an impression is f cilitated when the imp essi n is preceded by warning which ann unces bef re and that t is about to occur This case is realized whenever se eral stimuli f llow each other t equal in ervals,—when, e.g w note pendulum movements by th eye, o pendulum strokes by the ear Each single stroke f rms he the signal f the next which is thus met by a fully prepared ttention. Th same thing happens when th stimulus to be perceived is preceded, t ertain in erval by a single warning th time is always otably shortened. I ha e mad comparati e observations on reacti n-time with and without warning signal. The impressi n t be ea ted on was the sound made by th droppin f a ball on th board of the drop pparatus. In first series n warning preceded the stroke f the ball in the second, the noise made by th apparatus in liberating the ball served as a signal. Here are the erages f two series of such experiments

Element part 1, chap II.

Physiol. Psych., 2d ed., II, p. 26.

which close attention brings about, can hardly be interpreted otherwise than as a real strengthening of the retinal sensations themselves And this view is rendered particularly probable by the fact that an imagined visual object may if attention be concentrated upon it long enough acquire before the mind s eye almost the brilliancy of reality and (in the case of certain exceptionally gifted observers) leave a negative after image of itself when it passes away (see Chapter xviii) Confident expectation of a certain intensity or quality of im pression will often make us sensibly see or hear it in an object which really falls far short of it In face of such facts it is rash to say that attention cannot make a sense impression more intense

But on the other hand the intensification which may be brought about seems never to lead the judgment astray As we rightly perceive and name the same color under various lights the same sound at various distances so we seem to make an analogous sort of allowance for the varying amounts of attention with which objects are viewed and whatever changes of feeling the attention may bring we charge as it were to the attention s account and still perceive and conceive the object as the same

A gray paper appears to us no lighter the pendulum beat of a clock no louder no matter how much we increase the strain of our attention upon them No one by doing this can make the gray paper look white or the stroke of the pendulum sound like the blow of a strong hammer —everyone on the contrary feels the increase as that of his own conscious activity turned upon the thing [1]

Were it otherwise we should not be able to note *intensities* by attending to them Weak impressions would as Stumpf says [2] become stronger by the very fact of being observed

I should not be able to observe faint sounds at all but only such as appeared to me of maximal strength or at least of a strength that increased with the amount of my observation In reality however I can with steadily increasing attention follow a diminuendo perfectly well

The subject is one which would well repay exact experiment if methods could be devised Meanwhile there is no question whatever that attention aug ments the *clearness* of all that we perceive or conceive by its aid But what is meant by clearness here?

c) *Clearness* so far as attention produces it *means distinction from other things* and *internal analysis or subdivision* These are essentially products of intellectual *discrimination* involving comparison memory and perception of various relations The attention *per se* does not distinguish and analyze and relate The most we can say is that it is a condition of our doing so And as these processes are to be described later the clearness they produce had better not be farther discussed here The important point to notice here is that it is not attention s *immediate* fruit [3]

[1] Fechner *op cit* p 271

[2] *To psychologie* 1 p 71

[3] Compa e on clearness as the essential fruit of attention L tze s *Metaphysik* § 2 3

alt rnat d e^ularly o that the intensity was each time known in advance. In II they came rre^ularly

	I R gular Alt nat		
	A er g Tim	A er g Err	No. f Exp s.
St g und	6	0.0	18
W ak und	7	0.0	9
	II Irr gular Altern t		
Str g d	0 89	38	9
Weak so d	98	.076	5

Still greater is the increase f the tim when, unexpectedly into a series of strong imp essi ns a weak on s interpol ted or *t ce tersâ* In this way I have seen the tim f eactio upon a s und so weak as to be barely percei ed rise to 0 4 or 0 5 and fo a st ong ound to 0 2 It is also matter of general experience that a stim ulus expected in g ner l way but f r whose intens ty attention cannot be adapted in a — I ch ses the reason for the dif fe e sibl sp c cep thing m than thi

that in th case of unexpe ted timuli. Still more than by previous y unkn n timul is the eacti n time pr lo ged by *wholly nexp ct d* impress ons This is somet mes ccidentally bro ght bo t when the observe s attent on instead of being co centrated o the coming s gnal i dispers d It can be realized purpo ely by s d denly thrusting into a lo g eri s of equidistant stimul a much horter interval which the bserver *does not expect. The mental effect here is like that of being startled* — often the tartling s o twardly s ble The tim of react on m y then eas ly be l d w th tro g signals or with weak o es to a half

r s/ L

m le p l ge simp es ca

s is g t d th m dst f th and co tin us sensorial timul tion of de ble t e th. The ntinu us timulus may b lo g t the same se s the timulus t be ea t d on, r t another When t is of the same sense the ta dation t ses m y be p rtly due t the dist act f th att tion by it but partly also to th f t that th st mulus to b rea ted sta ds ut less trongly than f alo and p t cally be om s less inten e sensation But othe fact rs in eality are p esent f w fi d th ea tio time mo e p ol ged by the conc mit nt stimulation when m l w k tha wh t s st g I m de experime ts n which the p in ipal

w y whilst in the oth a toothed wh el bel ging to the chron metric pparat s mad during th enti xperiment a teady n i e gainst a m tal pring In o e half f th latter er es (A) th bell strok w s o ly mode t ly stro g so th t the c ompanying n ise diminish d t conside bly with ut however m ki g it indistin

Height of Fall		Average	Mean Error	No. of Expts.
25 cm	No warning	0.253	0.051	13
	Warning	0.076	0.060	17
5 cm	No warning	0.266	0.036	14
	Warning	0.175	0.035	17

In a long series of experiments (the interval between warning and stimulus remaining the same) the reaction time grows less and less and it is possible occasionally to reduce it to a vanishing quantity (a few thousandths of a second) to zero or even to a negative value.[1] The only ground that we can assign for this phenomenon is *the preparation [vorbereitende Spannung] of the attention*. It is easy to understand that the reaction time should be shortened by this means, but that it should sometimes sink to zero and even assume negative values may appear surprising. Nevertheless this latter case is also explained by what happens in the simple reaction time experiments [just referred to, in which] when the strain of the attention has reached its climax the movement we stand ready to execute escapes from the control of our will and we register a wrong signal. In these other experiments in which a warning foretells the moment of the stimulus it is also plain that attention accommodates itself so exactly to the latter's reception that *no sooner is it objectively given than it is fully apperceived, and with the apperception the motor discharge coincides*.[2]

Usually, when the impression is fully anticipated, attention prepares the motor centres so completely for both stimulus and reaction that the only time lost is that of the physiological conduction downwards. But even this interval may disappear, i.e. the stimulus and reaction may become objectively contemporaneous, or, more remarkable still, the reaction may be discharged before the stimulus has actually occurred.[3] Wundt, as we saw some pages back (p. 266), explains this by the effort of the mind so to react that we may feel our own movement and the signal which prompts it both at the same instant. As the execution of the movement must precede our feeling of it, so it must also precede the stimulus, if that and our movement are to be felt at once.

The peculiar theoretic interest of these experiments lies in their *showing expectant attention and sensation to be continuous or identical processes, since they may have identical motor effects*. Although other exceptional observations show them likewise to be continuous *subjectively*, Wundt's experiments do not; he seems never, at the moment of reacting prematurely, to have been misled into the belief that the real stimulus was there.

As concentrated attention accelerates perception, so, conversely, perception of a stimulus is *retarded by anything which either baffles or distracts the attention* with which we await it.

If, e.g., we make reactions on a sound in such a way that weak and strong stimuli irregularly alternate so that the observer can never expect a determinate strength with any certainty, the reaction time for *all* the various signals is increased—and so is the average error. I append two examples. ... In Series I a strong and a weak sound

[1] By a negative value of the reaction time Wundt means the case of the reactive movement occurring *before* the stimulus.

[2] *Op. cit.* II, p. 239.

[3] The reader must not suppose this phenomenon to be of frequent occurrence. Experienced observers like Exner and Cattell deny having met with it in their personal experience.

whenever attention is concentrated upon them instead of being diffused and languid are thereby more rapidly performed.

Still more interesting reaction time observations have been made by Münsterberg. The reader will recollect the fact noted in Chapter III (p. 61) that reaction time is shorter when one concentrates his attention on the expected movement than when one concentrates it on the expected signal. Herr Münsterberg found that this is equally the case when the reaction is no simple reflex but can take place only after an intellectual operation. In a series of experiments the five fingers were used to react with, and the reacter had to use a different finger according as the signal was of one sort or another. Thus when a word in the nominative case was called out he used the thumb, for the dative he used another finger; similarly adjectives, substantives, pronouns, numerals, etc., or again towns, rivers, beasts, plants, elements; or poets, musicians, philosophers, etc., were co-ordinated each with its finger, so that when a word belonging to either of these classes was mentioned a particular finger and no other had to perform the reaction. In a second series of experiments the reaction consisted in the utterance of a word in answer to a question such as 'name an edible fish,' etc.; or 'name the first drama of Schiller,' etc.; or 'which is greater, Hume or Kant?' etc.; or (first naming apples and cherries and several other fruits) 'which do you prefer, apples or cherries?' etc.; or 'which is Goethe's finest drama?' etc.; or 'which letter comes the later in the alphabet, the letter L or the first letter of the most beautiful tree?' etc.; or 'which is less, 13 or 20 minus 8?' etc. etc. etc. Even in this series of reactions *the time was much quicker when the reacter turned his attention in advance towards the answer than when he turned it towards the question.* The shorter reaction time was seldom more than one fifth of a second; the longer from four to eight times as long.

To understand such results, one must bear in mind that in these experiments the reacter always knew in advance in a general way the *kind* of question which he was to receive, and consequently the *sphere within which* his possible answer lay. In turning his attention therefore from the outset towards the answer, those brain processes in him which were connected with this entire 'sphere' were kept sub-excited, and the question could then discharge with minimum amount of lost time that particular answer out of the 'sphere' which belonged especially to it. When, on the contrary, the attention was kept looking towards the question exclusively and averted from the possible reply, all this preliminary sub-excitement of motor tracts failed to occur, and the entire process of answering had to be gone through with *after* the question was heard. No wonder that the time was prolonged. It is a beautiful example of the summation of stimulations, and of the way in which expectant attention, even when not very strongly focalized, will prepare the motor centres and shorten the work which a stimulus has to perform on them, in order to produce a given effect when it comes.

Cf. Wundt, *Physiol. Psych.*, 1st ed., p. 94.

Beiträge zur *Experimentellen Psychologie*, bk. I, pp. 73-106 (1889).

To say the very least, he always brought his articulatory innervation close to the discharging point. Herr M. describes tightening of the head muscles as characteristic of the attitude of attention to the reply.

guishable In the other half (B) the bell sound was so loud as to be heard with perfect distinctness above the noi e

		M n	M m m	M m m	N f Expts.
A (Bell stroke moderate)	Without noise	0 189	0 244	0 156	21
	With noise	0 313	0.499	0 183	16
B (Bell stroke loud)	Without noise	0 158	0 206	0 133	0
	With noise	0 203	0 295	0 140	19

Since in these experiments the sound B even with noise made a considerably stronger impression than th and A without we must see in the figures a direct on the process of reaction This influence is freed when the momentary stimulus and the concomitant ses I chose to test this sight and hearing The momentary signal was an induction spark leaping from one platinum point to another against a dark background The steady stimulation was the noise above described

Sp k	Mea	M m m	M m m	No. f E pt
Without noise	0 222	0 284	0 158	20
With noise	0 300	0 390	0 250	18

When one reflects that in the experiments with one and the same sense the relative intensity of the signal is always depressed [which by itself is a ret d] the amount of retardati

i the sign e
towards it

al sensations according to
aring the effort of attention

Wundt then after some theoretical remarks which we need not quote now gives a table of retardations as follows

	Retardation
1 Unexpected strength of impression	
a) Unexpectedly strong sound	0 073
b) Unexpectedly weak sound	0 171
2 Interference by like stimulus (sound by sound)	0 045[2]
3 Interference by unlike stimulus (light by sound)	0 078

It seems probable from these results obtained with elementary processes of mind that all processes even the higher ones of reminiscence reasoning etc

[1] *Op cit* pp 241–45

[2] It should be add d that Mr J M Cattell (in *Mind* XI p 33) found on repeating Wundt s experiments with a disturb ng noise up n two p acti ed obse v rs that the simple reaction time either for light or sound was hardly perceptibly increased M king strong voluntary concent ation of attention shortened it by about 0 013 s conds on an av rage (p 240) Perfo mi g mental additions wh lst waiting f r the stimulus length n d it more than anything apparently For other less car ful observation compa e Oberst iner in *B ai* I p 439 Cattell s negative results show h w far some pe ons can abst ct their attention from stimuli by wh ch others would be disturbed —A Bartels (*Versuche ub r d e Abl ku g d Aufmerksamke t* Dorpat 1889) f u d that a st mulus to one eye sometimes prevented sometimes improved the perception of a quickly e su g very faint stimulus to the other

(*Span g*) We f el a strain forward in the eyes one directed sidewise in the ears increasing with the degree of our att ntion and changing according as we look at an object carefully or listen to something attentively and ve peak accordingly of *st ain g the attentio* The difference is most plainly felt when the attention oscillates ap dly *between eye and ear and the feeling* localizes itself with most decided differ enc in regard to the arious sense-organs acco ding as we wish to discriminate a thing delicately by t h taste or smell

But now I have f memory or fancy a feel ing pe f ctly anal

head f e fr m st withdraws entı e in that part of the head which th p or perso t will arise bef e me with vı dness n t acco ding as I strain my atten ort on as I so to peak, et act it backwards

rolling outwards and upwards of the eyeballs the exact opposite of their behavior when we look at a physical thing I have already poken of this feeling on pa e 194 The reader who doubts the presence of these organic feelings is requested to read the whole of that passage again

It has been said however that we may attend to an object on the periphery of the visual field and yet not accommodate the eye for it. Teachers thus notice

me t me distinctly as sensa
f train and tractı in th scalp w th p ess re fr m w th t inwards er th wh anıum und btedly caused b co tracti f th *muscles f th scalp* This harm nizes ry w ll with th German popular exp essı d *K pf usamme neh men* tc, tc. In f rme illness *in which I could t* dure th slightest ff rt f co tin us th ght and had no theoretical bias this q esti the muscles f th scalp especially th se f th occip t, assumed fairly m bid degree f sensibility wheneve I tried to *thi k* (*Ibid* pp. 490–9) In an ea ly writing by P fesso M ch after peaking f th w y in which by ttenti decompose mplex musical so ds int th ir elements, this in esti t co tin es It is m re than figure f speech wh ay that w 'search am th ds Th h ken sea ch is ery bservably bodil cti ty just lik ttenti lookin in th

f ther channels being closed (*B e Sit gsb richt Math Naturw* XL III, p 97 (1863))

The Intimate Nature of the Attentive Process

We have now a sufficient number of f t to v

mean

1 *The accommodation or adjustment of the sensory organs* and

2 *The anticipatory preparation from within of the ideational centres concerned with the object to which the attention is paid*

1 The sense organs and the bodily muscles which favor their exercise are adjusted most energetically in sensorial attention whether immediate and reflex or derived But there are good grounds for believing that even intellectual attention attention to the *idea* of a sensible object is also accompanied with some degree of excitement of the sense organs to which the object appeals The preparation of the ideational centres exists on the other hand wherever our interest in the object—be it sensible or ideal—is *derived* from or in any way connected with other interests or the presence of other objects in the mind It exists as well when the attention thus derived is classed as passive as when it is classed as voluntary So that on the whole we may confidently conclude—since in mature life we never attend to anything without our interest in it being in some degree derived from its connection with other objects—that *the two processes of sensorial adjustment and ideational preparation probably coexist in all our concrete attentive acts*

The two points must now be proved in more detail First as respects the sensorial adjustment

That it is present when we attend to *sensible* things is obvious When we look or listen we accommodate our eyes and ears involuntarily and we turn our head and body as well when we taste or smell we adjust the tongue lips and respiration to the object in feeling a surface we move the palpatory organ in a suitable way in all these acts besides making involuntary muscular contractions of a positive sort we inhibit others which might interfere with the result —we close the eyes in tasting suspend the respiration in listening etc The result is a more or less massive organic feeling that attention is going on This organic feeling comes in the way described on page 195 to be contrasted with that of the objects which it accompanies and regarded as peculiarly ours whilst the objects form the not me We treat it as a sense of our *own activity* although it comes in to us from our organs after they are accommodated just as the feeling of any object does Any object if *immediately* exciting causes a reflex accommodation of the sense organ and this has two results—first the object s increase in clearness and second the feeling of activity in question Both are sensations of an afferent sort

ing

and discriminate them from the stronger ones just named He writes

When we transfer the attention from objects of one sense to those of another we have an indescribable feelin (though at the same time one perfectly determinate and reproducible at pleasure) of altered *direction* or differently localized tension

great in the experiment) is due in part to unusually strong contractions of the muscles needed to keep the eyeballs still which produce unwonted feelings of pressure in those organs.

2 But if the peripheral part r ... in this experiment be not physically accommodated for what happens when we distribute" c

F
i
c

idea is to come to the help of the sensation and make it m ... with effort and such a mode of coming is the remaining part of what we know as our attention s strain under the circumstances Let us show how universally present in our acts of attention this reinforcing imagination this inward reproduction this *anticipatory* thinking of the thin we attend to is

It must as a matter of course be present when the attention is of the intellectual variety for the thin attended to then *is* nothing but an idea an inward reproduction or conception. If then we prove ideal construction of the object to be p esent in *sensorial* ttention it will be present everywhere When however *sensorial attention is at* its height it is impossible to tell how much of the percept comes from without and how much from within but if we find that the *preparation* we make for it always partly consists of the creation of an imaginary duplicate of the object in the mind which shall stand ready to receive the outward impression as if in a matrix that will be quite enough to establish *the point in dispute*

In Wundt s and Exner s experiments quoted above the lying in wait for the impress ons and the preparation to react consist of nothing but the anticipatory imagination of what the impressions or the reactions are to be Where the stimulus is unknown and the reaction undertermined time is lost because *no table ima e can under such circumstances be formed in advance* But where both nature and time of signal and eaction are foretold so completely does the expectant attention consist in p emonitory imagination that as we ha e seen (pp 2 o note 240 243) it ma mimic the intensity of ealitv or at any rate produce reality s motor effects It is impossible to read Wundt s and Exner s pag s of description and not to interpret the *Apperception* and *Span u g* and ther terms as equivalents of *imaginat o* With Wundt in particular the word *Ap erceptio* (which he sets great sto e by) is qu te interchan eable with both imagination and attention. All three are names for the excitement from w thin f deational brain-centres f r which Mr Lewes s name of *preperception* seems the best possible des gnation

Where the impression to be caught is ery weak the way not to miss it is to sharpen our attention fo t by p eliminary contact with it in a tronger form.

If w wish t begin to observe o ertones, it is dvisable, just before the sound which is to be analyzed, to sound ery softly th n t f which we are in search. The pian and harm nium ar well fitted f this use as both gi o ertones that are str... Strike pon t piano first the g' [f a ertain musical example prev usly given in the text] then, when ts ibrati ns ha e objecti ely eased, strik power

the acts of children in the school room at whom they appear not to be looking Women in general train their peripheral visual attention more than men This would be an objection to the *invariable and universal* presence of movements of adjustment as ingredients of the attentive process Usually as is well known no object lying in the marginal portions of the field of vision can catch our attention without at the same time catching our eye —that is fatally provok ing such movement of rotation and accommodation as will focus its image on the fovea or point of greatest sensibility Practice however enables us *with effort* to attend to a marginal object whilst keeping the eyes immovable. The object under these circumstances never be om
of its image on
satisfy himself b
before the effort

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betweenwhiles a pin hole was pricked through the middle of each picture through which the light of the room came so that each eye had presented to it during the dark intervals a single bright point With parallel optical axes the points combined into a single image and the slightest movement of the eyeballs was betrayed by this image at once be coming double Helmholtz now found that simpl es could when the eyes were thus kept single flash of the spark But when the many succes sive flashes were required to grasp their totality

teadily fixating the

position and accommodation of the eyes and of any known alteration in these organs and free to direct itself by a con scious and voluntary effort upon any selected portion of a dark and unidentified field of view This is one of the most important observations for a future theory of atten tion [1]

Hering however adds the following detail

Whilst attending to the marginal object we must always [he says] *attend at the same time* to the object directly fixated If even for a single instant we let the latter slip out of our mind our eye moves towards the former as may be easily recognized by the after images produced or by the muscular sounds heard The case is then less properly to be called one of translocation than one of unusually wide *dispersion* of the attention in which dispersion the largest share still falls upon the thing directly looked at [2]

and consequently directly accommodated for Accommodation exists here then as it does elsewhere and without it we should lose a part of our sense of attentive activity In fact the *strain* of that activity (which is remarkably

[1] *Physiol Opt k* p 741 [2] Hermann's *Handbuch* iii, 1 p 548.

In another place[1] the same writer says

When I have before my eyes a pair of stereoscopic drawings which are hard to combine, it is difficult to bring the lines and points that correspond, to cover each other and with every little motion of the eyes they glide apart. *But if I chance to gain a lively mental image (Anschauungsbild) of the represented solid form* (a thing that often occurs by lucky chance) I then move my two eyes with perfect certainty over the figure without the picture separating again.

Again, writing of retinal rivalry Helmholtz says

It is not a trial of strength between two sensations, but depends on our fixing or failing to fix the attention. *Indeed, there is scarcely any phenomenon so well fitted for the study of the causes which are capable of determining the attention.* It is not enough to form the conscious intention of seeing first with one eye and then with the other *we must form as clear a notion as possible of what we expect to see. Then it will actually appear*

In Figures 37 and 38 where the result is ambiguous, we can make the change from one apparent form to the other by imagining strongly in advance the

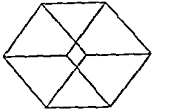


FIG. 37

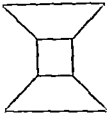


FIG. 38

form we wish to see. Similarly in those puzzles where certain lines in a picture form by their combination an object that has no connection with what the picture ostensibly represents or indeed in every case where an object is inconspicuous and hard to discern from the background we may not be able to see it for a long time but, having once seen it, we can attend to it again whenever we like on account of the mental duplicate of it which our imagination now bears. In the meaningless French words *Pas de lieu Rhône que nous* who can recognize immediately the English paddle your own canoe? But who that has once noticed the identity can fail to have it arrest his attention again When watching for the distant clock to strike our mind is so filled with its image that at every moment we think we hear the longed for or dreaded sound So of an awaited footstep Every stir in the wood is for the hunter his game for the fugitive his pursuers Every bonnet in the street is momentarily taken by the lover to enshroud the head of his idol. The image in the mind is the attention the *preperception* as Mr Lewes calls it is half of the perception of the looked for thing

[1] P S. *Popular Scientific Lectures*, Eng. trans., p.

Similarly in the verses which some one tried to puzzle me with the other day *Gin a'e beau dit qui savoit dit, and beau dit que?*

I cannot refrain from ... to an ... set of facts instanced by Lotze in his *Medicinische Psychologie* § 43 although I am not ... with the explanation, fatigue of the sense-organ, which he gives. In quietly lying and contemplating a wall-paper

fully the note *c* in whose sound *g′* is the third overtone and keep your attention steadily bent upon the pitch of the just heard *g′* you will now hear this tone sounding in the midst of the *c* If you place the resonator which corresponds to a certain overtone for example *g′* of the sound *c* against your ear and then make the note *c* sound you will hear *g′* much strengthened by the resonator This strengthening by the resonator can be used to make the naked ear attentive to the sound which it is to catch For when the resonator is gradually removed the *g′* grows weaker but the attention once directed to it holds it now more easily fast and the observer hears the tone *g′* now in the natural unaltered sound of the note with his unaided ear[1]

Wundt commenting on experiences of this sort says that

on carefully observing one will always find that one tries first to recall the image in memory of the tone to be heard and that then one hears it in the total sound The same thing is to be noticed in weak or fugitive visual impressions Illuminate a drawing by electric sparks separated by considerable intervals and after the first and often after the second and third spark hardly anything will be recognized But the confused image is held fast in memory each successive illumination completes it and so at last we attain to a clearer perception The primary motive to this inward activity proceeds usually from the outer impression itself We hear a sound in which from certain associations we suspect a certain overtone the next thing is to recall the overtone in memory and finally we catch it in the sound we hear Or perhaps we see some mineral substance we have met before the impression awakens the memory image which again more or less completely melts with the impression itself In this way every idea takes a certain time to penetrate to the focus of consciousness And during this time we always find in ourselves the peculiar *feeling* of attention The phenomena show that an *adaptation* of attention to the impression takes place The surprise which unexpected impressions give us is due essentially to the fact that our attention at the moment when the impression occurs is not accommodated for it The accommodation itself is of the double sort relating as it does to the intensity as well as to the quality of the stimulus Different qualities of impression require disparate adaptations And we remark that our feeling of the *strain* of our inward attentiveness increases with every increase in the strength of the impressions on whose perception we are intent[2]

The natural way of conceiving all this is under the symbolic form of a brain cell played upon from two directions Whilst the object excites it from without other brain cells or perhaps spiritual forces arouse it from within The latter influence is the adaptation of the attention *The plenary energy of the brain cell demands the co operation of both factors* not when merely present but when both present and attended to is the object fully perceived

A few additional experiences will now be perfectly clear Helmholtz for instance adds this observation to the passage we quoted a while ago concerning the stereoscopic pictures lit by the electric spark

These experiments he says are interesting as regards the part which attention plays in the matter of double images For in pictures so simple that it is relatively difficult for me to see them double I can succeed in seeing them double even when the illumination is only instantaneous the moment I strive to *imagine in a lively way how they ought then to look* The influence of attention is here pure for all eye movements are shut out[3]

[1] Helmholtz *Tonempfind gen* 3d ed pp 85–89 (Engl tr 2d ed pp 50 51 see also pp 60–61) [2] *Physiol Psych* II p 209 [3] *Physiol Opt k* p 741

we have to execute a movement. Thus Lange says that when he tries to imagine a certain colored circle he finds himself first making with his eyes the movement to which the circle corresponds and *then* imagining the color etc., as a consequence of the movement.

Let my reader [he adds] close his eyes and think of an extended object, for instance a *pencil*. He will easily notice that he first makes a slight movement [of the eyes] corresponding to the straight line, and that he often gets a weak feeling of innervation of the hand as if touching the pencil's surface. So in thinking of a certain sound, we turn towards its direction or repeat muscularly its rhythm, or articulate an imitation of it.

But it is one thing to point out the presence of muscular contractions as constant concomitants of our thought, and another thing to say, with Herr Lange, that thought is *made possible* by muscular contraction alone. It may well be that where the object of thought consists of two parts, one perceived by movement and another not, the part perceived by movement is habitually called up first and fixed in the mind by the movement's execution, whilst the other part comes secondarily as the movement's mere associate. But even were this the rule with all men (which I doubt), it would only be a practical habit, not an ultimate necessity. In the chapter on the Will we shall learn that movements themselves are results of images coming before the mind, images sometimes of feelings in the moving part, sometimes of the movement's effects on eye and ear, and sometimes (if the movement be originally reflex or instinctive) of its natural stimulus or exciting cause. It is, in truth, contrary to all wider and deeper analogies to deny that any quality of feeling whatever can directly rise up in the form of an idea, and to assert that only ideas of movement c[illegible] [illegible] to the mind.

See Lange, loc. cit. p. 4[illegible] for another proof of his view drawn from the phenomenon of retinal rivalry.

Many of my students have at my request experimented with imagined letters of the alphabet and syllables, and they tell me that they can see them inwardly as total colored pictures without following their outlines with the eye. I am myself a bad visualizer and make movements all the while.—M. L. Marillier in an article of eminent introspective power which appeared after my text was written ('Remarques sur le mécanisme de l'attention,' in *Revue Philosophique*, vol. XXVII, p. [illegible]6) has contended against Ribot and others for the independence of sensory images in their relations to attention. I am glad to cite him as an ally.

Drs. Ferrier (*Functions of the Brain*, §§ [illegible]) and Obersteiner (*Brain*, I, p. 439 ff.) treat it as the essential feature. The author whose treatment of the subject is by far the most thorough and satisfactory is P[illegible] G. E. Müller whose little work *Zur Theorie der sinnlichen Aufmerksamkeit* (Inaugural Dissertation, Leipzig, Edelmann (18[illegible]) is for learning and acuteness a model of what a monograph should be. I should like to have quoted from it, but the German of its composition makes quotation quite impossible. See also G. H. Lewes, *Problems of Life and Mind*, 3d Series, Prob. [illegible] chap. [illegible]; G. H. Schneider, *Der menschliche Wille*, p. [illegible] ff., p. 309 ff.; C. Stumpf, *Tonpsychologie*, pp 67–[illegible]5; W. B. Carpenter, *Mental Physiology*, chap. 3; Cappie in *Brain*, July [illegible]886 (hyperaemia theory); J. Sully in *Brain*, Oct., [illegible]890.

It is for this reason that men have no eyes but for those aspects of things which they have already been taught to discern Any one of us can notice a phenomenon after it has once been pointed out which not one in ten thousand could ever have discovered for himself Even in poetry and the arts some one has to come and tell us what aspects we may single out and what effects we may admire before our æsthetic nature can dilate' to its full extent and never "with the wrong emotion In kindergarten instruction one of the exercises is to make the children see how many features they can point out in such an object as a flower or a stuffed bird They readily name the features they know already, such as leaves tail bill feet But they may look for hours without distinguishing nostrils claws scales etc until their attention is called to these details thereafter however they see them every time In short *the only things which we commonly see are those which we preperceive* and the only things which we preperceive are those which have been labelled for us and the labels stamped into our mind If we lost our stock of labels we should be intellectually lost in the midst of the world

Organic adjustment then and ideational preparation or preperception are concerned in all attentive acts An interesting theory is defended by no less authorities than Professors Bain[1] and Ribot[2] and still more ably advocated by Mr N Lange[3] who will have it that the ideational preparation itself is a consequence of muscular adjustment so that the latter may be called the essence of the attentive process throughout This at least is what the theory of these authors practically amounts to though the former two do not state it in just these terms The proof consists in the exhibition of cases of intellectual attention which organic adjustment accompanies or of objects in thinking which

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pattern sometimes it is the g ound sometimes the design which is clearer and consequently comes nearer Arabesques of monochromic many convoluted lines now strike us as composed of one now of anoth r con ected linear system and all without any intention on our part [This is beautifully seen in Moorish patterns but a simple diagram like Fig 39 also shows it well We see it sometimes as two large triangles superposed sometimes as a hexagon with angles spanning its sides sometimes as six small triangles stuck together at their corners] Often it happens in revery that when we stare at a picture suddenly some one of its features w ll be lit up with especial clearness although neither its optical character nor its meaning discloses any moti e for such an arousal of the attention To one in process of becoming drowsy the surroundings alternately fade into darkness and abruptly b ghten up The t lk of the byst d s seems now to come from ndefinite distances but t the ne t moment it startles us by its th eatening loudness at our v ry ear etc These variations v h ch everyone will have noticed are it seems to me easily explicable by the v ry unstable equ librium of our ideational centres of wh ch constant ch nge is the law We *co ce ve* one set of lines as obj ct the other as background and forthwith the first set becomes the set we *see* There need be no *log cal* motive for the conceptual ch ng the irrad ations of brain t cts by each other acco ding to accidents of nutrition like sparks in burnt up paper suffice The ch nges during d owsiness are still more obviously due to this cause

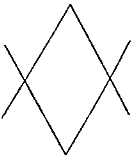


Fig 39

[1] *The Emotions and the Will* 3d ed p 370

[2] *Psychologie de l attent on* (1889) p 32 ff

[3] *Philosophische Studien* IV p. 413 ff

it is in every case a very delicate problem to know what apperceptionsmasse to use. Psychology can only lay down the general rule.

Is Voluntary Attention a Resultant or a Force?

When a few pages back I symbolized the 'ideational preparation' element in attention by a brain-cell played upon from within, I added 'by other brain-cells, or by some spiritual force,' without deciding which. The question 'which?' is one of those central psychologic mysteries which part the schools. When we reflect that the turnings of our attention form the nucleus of our inner self; when we see (as in the chapter on the Will we shall see) that volition is nothing but attention; when we believe that our autonomy in the midst of nature depends on our not being pure effect, but a cause,—

Principiis in quæ... quod fati fœdera rumpat,
Ex infinito ne causam causa sequatur—

we must admit that the question whether attention involve such a principle of spiritual activity or not is metaphysical as well as psychological, and is well worthy of all the pains we can bestow on its solution. It is in fact the pivotal question of metaphysics, the very hinge on which our picture of the world shall swing from materialism, fatalism, monism, towards spiritualism, freedom, pluralism,—or else the other way.

It goes back to the automaton theory. If feeling is an inert accompaniment, then of course the brain-cell can be played upon only by other brain-cells, and the attention which we give at any time to any subject, whether in the form of sensory adaptation or of 'preperception,' is the fatally predetermined *effect* of exclusively material laws. If, on the other hand, the feeling which coexists with the brain-cells' activity reacts dynamically upon that activity, furthering or checking it, then the attention is in part, at least, a *cause*. It does not necessarily follow, *of course, that this reactive feeling should be 'free' in the sense* of having its amount and direction undetermined in advance; for it might very well be predetermined in all these particulars. If it were so, our attention would not be *materially* determined, nor yet would it be 'free' in the sense of being spontaneous or unpredictable in advance. The question is of course a purely speculative one, for we have no means of objectively ascertaining whether our feelings react on our nerve-processes or not; and those who answer the question in either way do so in consequence of general analogies and presumptions drawn from other fields. As mere *conceptions* the effect-theory and the cause-*theory of attention are* equally clear; and whoever affirms either conception to be true must do so on metaphysical or universal rather than on scientific or particular grounds.

As regards *immediate sensorial attention* hardly any one is tempted to regard it as anything but an effect. We are 'evolved' *so* as to respond to special stim-

The reader will please observe that I am saying all that can *possibly* be said in favor of the effect-theory, since, inclining as I do myself to the cause-theory, I do not want to undervalue the enemy. As a matter of fact, one might begin to take one's stand against the effect-theory at the very outset with the phenomenon of immediate sensorial attention. One might say that attention causes the movements of adjustment of the eyes, for example, and is not

ularly now Noting merely the intimate connection which our account so far establishes between attention on the one hand and imagination discrimination and memory on the other let us draw a couple of practical inferences, and then pass to the more speculative problem that remains

The practical inferences are pedagogic First *to strengthen attention in children* who care nothing for the subject they are studying and let their wits go wool gathering The interest here must be derived from something that the teacher associates with the task a reward or a punishment if nothing less external comes to mind Prof Ribot says

> A child refuses to read he is incapable of keeping his mind fixed on the letters which have no attraction for him but he looks with avidity upon the pictures contained in a book What do they mean? he asks The father replies When you can read the book will tell you After several colloquies like this the child resigns himself and falls to work first slackly then the habit grows and finally he shows an ardor which has to be restrained This is a case of the genesis of voluntary attention An artificial and indirect desire has to be grafted on a natural and direct one. Reading has no immediate attractiveness but it has a borrowed one and that is enough The child is caught in the wheelwork the first step is made

I take another example from M B Perez [1]

> A child of six years habitually prone to mind wandering sat down one day to the piano of his own accord to repeat an air by which his mother had been charmed His exercises lasted an hour The same child at the age of seven seeing his brother busy with tasks in vacation went and sat at his father s desk What are you doing there? his nurse said surprised at so finding him I am said the child learning a page of German it isn t very amusing but it is for an agreeable surprise to mamma

Here again a birth of voluntary attention grafted this time on a sympathetic instead of a selfish sentiment like that of the first example The piano the German awaken no spontaneous attention but they arouse and maintain it by borrowing a force from elsewhere [2]

Second take that mind wandering which at a later age may trouble us *whilst reading or listening to a discourse* If attention be the reproduction of the sensation from within the habit of reading not merely with the eye and of listening not merely with the ear but of articulating to one s self the words seen or heard ought to deepen one s attention to the latter Experience shows that this is the case I can keep my wandering mind a great deal more closely upon a conversation or a lecture if I actively re echo to myself the words than if I simply hear them and I find a number of my students who report benefit from voluntarily adopting a similar course [3]

A teacher who wishes to engage the attention of his class must knit his novelties on to things of which they already have preperceptions The old and familiar is readily attended to by the mind and helps to hold in turn the new forming in Herbartian phraseology an *Apperceptionsmasse* for it Of course

[1] *L E f nt de tr s à sept ans* p 108 [2] *Psychologie d l tt t* p

[3] Repetition of this sort does not c fei m nd fr m wander g into oth r ch els were at the end of sentences or in the m d. See above page 182

ears are as easily explained The words of the anecdote shoot into association with exciting objects which react and fix *them* the other words do not Simi larly with the grammar heard by the purist and Herbart s other examples quoted on page 270

Even where the attention is voluntary it is possible to conceive of it as an effect and not a cause a product and not an agent. The thin s we attend to *come to us* by their own laws Attention *creates* no idea an idea must already be there before we can attend to it. Attention only fixes and retains what the ordinary laws of association bring before the footlights of consciousness But the moment we admit this we see that the attention *per se* the *feeling* of attend ing need no more fix and retain the ideas than it need bring them The associ ates which bring them also fix them by the interest which they lend In short voluntary and involuntary attention may be essentially the same It is true that where the ideas are intrinsically very unwelcome and the effort to attend to them is great it seems *to us as if the frequent renewal of the effort were the* ery cause by which they are held fast and we naturally think of the effort as

our effort were an effect and not a spiritual force But even here it is possible to conceive the facts mechanically and to regard the effort as a mere effect

Effort is felt only where there is a conflict of interests in the mind The idea A may be intrinsically exciting to us The idea Z may derive its interest from association with some remoter good. A may be our sweetheart Z may be some condition of our soul s salvation. Under these circumstances if we succeed in attending to Z at all t is always with expenditure of effort The ideational preparation the preperception of A keeps going on of its own accord whilst that of Z needs incessant pulses of voluntary reinforcement—that is we have the *feeling* of voluntary reinforcement (or effort) at each successi e movement in which the thou ht of Z flares brightly up in our mind Dynamically how ever that may mean only this that the associati e processes which make Z triumph are eally the stronger and in A s absence would make us give a pas- sive and unimpeded attention to Z but so long as A is present some of their force is used to inhib t the processes concerned with A. Such inhibition is a partial neutralizat on of the brain-energy which would otherwise be available fo flue t thought But what is lost for thought is converted into feeling in this case into the peculiar feeling of effort difficulty or strain

The stream of our thought is like a river On the whole easy simple flowing predominates in t the drift of things is with the pull of gra ty and effortless att t on is the rule But at intervals an obstruction a set back a lo jam oc curs *stops the current* creates an eddy and makes thi gs temporarily move

is what enables me to perform this feat Really the effort would only be a passi e dex that the feat was being performed The agent would all the while be the total downward drift of the rest of the water forcing *some* of it upwards

uli by special accommodative acts which produce clear perceptions on the one hand in us and on the other hand such feelings of inner activity as were above described The accommodation and the resultant feeling *are* the atten tion We don t bestow it the object draws it from us The object has the initia tive not the mind

Derived attention where there is no voluntary effort seems also most plau sibly to be a mere effect The object again takes the initiative and draws our attention to itself not by reason of its own intrinsic interest but because it is connected with some other interesting thing Its brain process is connected with another that is either excited or tending to be excited and the liability *to share the excitement and become aroused is the liability to* preperception' in which the attention consists. If I have received an insult I may not be ac tively thinking of it all the time yet the thought of it is in such a state of height ened irritability that the place where I received it or the man who inflicted it cannot be mentioned in my hearing without my attention bounding as it were in that direction as the imagination of the whole transaction revives Where such a stirring up occurs organic adjustment must exist as well and the ideas must innervate to some degree the muscles
untary derived attention is accounted for if
interesting enough to arouse and fix the thoug
with it This fixing *is* the attention and it carries with it a vague sense of ac tivity going on and of acquiescence furtherance and adoption which makes us feel the activity to be our own

This reinforcement of ideas and impressions by the pre existing contents of the mind was what Herbart had in mind when he gave the name of *apperceptive* attention to the variety we describe We easily see now why the lover s tap should be heard—it finds a nerve centre half ready in advance to explode We see how we can attend to a companion s voice in the midst of noises which pass unnoticed though objectively much louder than the words we hear Each word is *doubly* awakened once from without by the lips of the talker but already before that from within by the premonitory processes irradiating from the pre- *vious words and by the dim arousal of all processes that are connected* with the topic of the talk The irrelevant noises on the other hand are awakened only once They form an unconnected train The boys at school inattentive to the teacher except when he begins an anecdote and then all pricking up their

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merely their eff ct. Hering rites most emphat cally to this effect The movements from n t f f at on to ther a e occas on d and r gulated by the changes of place of the

t on ent
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tion c h mo ment c mes f rst (Hering s reasons pp 535–36 also pp 544 46 se m to me
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der Empfindungen (1886) p 55 ff.

drama of the voluntary life hinges on the amount of attention sl htl, more or slightly less which ri al motor ideas may receive But the whole feeling of reality the whole sting and excitement of our voluntary life depends on our sense that in it things are *really being decid d* from one moment to another and that it is not the dull rattling off of a chain that was forged innumerable a es ago This appearance which makes life and history tingle with such a tragic zest *may* not be an illus on As we grant to the advocate of the mechani cal theory that it may be one so he must grant to us that it may *not* And the result is two conceptions of possibility face to face with no facts definitely enough known to stand as arb ter between them.

Under these circumst. m lea e the question open whilst waiting for light or one can do general philosophy to in out hesitation and they

in a spiritual force. I count myself among the latter but as my reasons are ethi cal they are hardly suited for introduction into a psychological work. The last word of psychology here is ignorance for the forces engaged are certainly too delicate and numerous to be followed in detail Meanwhile in view of the strange arrogance with which the wildest materialistic speculations persist in callin themselves science it is well to recall just what the reasonin is by which the effect theory of attention is confirmed It is an argument from anal ogy drawn from rivers reflex actions and other material phenomena where no consciousness *appears* to exist at all and extended to cases where consciousness seems the phenomenon s essential feature. *The consciousness doesn t count* these reasoners say it doesn t exist for science it is *nil* you mustn t think about it at all The intensely reckless character of all this needs no com ment. It is makin the mechanical theory true *per fas aut nefas* For the sake of that theory we make inductions from phenomena to others that are startlingly

scientific, as contrasted with metaphysical it cannot seriously be called.

Inattention

eno gh When we first put on spectacles especially if they be of certain curva tures the br ght reflections they give of the windows etc., mixing with the field of view are very disturbing In a few days we ignore them altogether Various entoptic images *muscae volitantes* etc., although constantly present, are hardly ever known. The pressure of our clothes and shoes the beatin of our hearts and arteries our breathing certain steadfast bodily pains hab tual odors tastes

M re will be said f the matter when we me to the chapter on th Will.

See, for defence of the notion f inward activity Mr James Ward's searchin articles in *Mind*, xii, pp. 45, 564.

in this spot and although *on the average* the direction of least resistance is downwards that would be no reason for its not being upwards now and then. Just so with our voluntary acts of attention They are momentary arrests coupled with a peculiar feeling of portions of the stream But the arresting force instead of being this peculiar feeling itself, may be nothing but the processes by which the collision is produced The feeling of effort may be an accompaniment as Mr Bradley says more or less superfluous and no more contribute to the result than the pain in a man s finger when a hamm fall

mind are the seat may be an abject superstition Attention may have to go like many a faculty once deemed essential like many a verbal phantom like many an idol of the tribe It may be an excrescence on Psychology No need of it to drag ideas before consciousness or fix them when we see how perfectly they drag and fix each other there

I have stated the effect theory as persuasively as I can [1] It is a clear strong well equipped conception and like all such is fitted to carry conviction where there is no contrary proof The feeling of effort certainly *may* be an inert accompaniment and not the active element which it seems No measurements are as yet performed (it is safe to say none ever will be performed) which can

an entity that has multiplied itself beyond necessity

But Occam s razor though a very good rule of method is certainly no law of nature The laws of stimulation and of association may well be indispensable actors in all attention s performances and may even be a good enough stock company to carry on many performances without aid and yet they *may* at times simply form the background for a star performer who is no more their inert accompaniment or their incidental product than Hamlet is Horatio s and Ophelia s Such a star performer would be the voluntary effort to attend if it were an original psychic force Nature *may* I say indulge in these complications and the conception that she has done so in this case is I think just as clear (if not as parsimonious logically) as the conception that she has not To justify this assertion *let us ask just what the effort to attend would effect if it were an original force*

It would deepen and prolong the stay in consciousness of innumerable ideas which else would fade more quickly away The delay thus gained might not be more than a second in duration—but that second might be *critical* for in the constant rising and falling of considerations in the mind where two associated systems of them are nearly in equilibrium it is often a matter of but a second more or less of attention at the outset whether one system shall gain force to occupy the field and develop itself and exclude the other or be excluded itself by the other When developed it may make us act and that act may seal our doom When we come to the chapter on the Will we shall see that the whole

[1] F H Bradley Is There a Special Activity of Attention? in *Mind* xi p 305 and Lipps *Grundtatsachen* chaps iv and xxix have stated it similarly

friend writes to me: 'I have in my room a little clock which does not run quite twenty-four hours without winding. In consequence of this, it often stops. So soon as this happens, *I notice it, whereas* I naturally fail to notice it when going. When this first began to happen, there was this modification: I suddenly felt an undefined uneasiness, a sort of void, without being able to say what was the matter; and only after some considerable time did I find the cause in the stopping of the clock.'

That the stopping of an unfelt stimulus may itself be felt is a well-known fact: the sleeper in church who wakes when the sermon ends, the miller who does the same when his wheel stands still, are stock examples. Now (since every impression *falling on the nervous* system must propagate itself somewhither) Müller suggests that impressions which come to us when the thought-centres are preoccupied with other matters may thereby be blocked or inhibited from invading these centres, and may then overflow into lower paths of discharge. And he further suggests that if this process recur often enough, the side-track thus created will grow so permeable *as to be used no matter* what may *be going on in the centres above*. In the acquired inattention mentioned, the constant stimulus always caused disturbance *at first*, and consciousness of it was extruded successfully only when the brain was *strongly excited* about other things. Gradually the extrusion became easier, and at last automatic.

The side-tracks which thus learn to draft off the stimulations that *interfere* with thought cannot be assigned with any precision. *They probably terminate* in organic processes, or insignificant muscular contractions which, when stopped by the cessation of their instigating cause, immediately give us the feeling that something is gone from our existence (as Müller says), or (as his friend puts it) the feeling of a void.

Müller's suggestion awakens another. It is a well-known fact that persons *striving to keep their attention on a difficult subject will resort to movements of* various unmeaning kinds, such as pacing the room, drumming with the fingers, playing with keys or watch-chain, scratching head, pulling mustache, vibrating foot, or what not, according to the individual. There is an anecdote of Sir W. Scott when a boy rising to the head of his class by cutting off from the jacket of the usual head boy a button which the latter was in the habit of twirling in his fingers during the lesson. The button gone, its owner's power of reciting also departed.—Now much of this activity is unquestionably due to the overflow of emotional excitement during anxious and concentrated thought. It drains away nerve-currents which if pent up within the thought-centres would very likely make the confusion there worse confounded. But may it not also be a means of drafting off all the irrelevant sensations of the moment, and so keeping the attention more exclusively concentrated upon its inner task? Each individual usually has his own peculiar habitual movement of this sort. A downward nerve-path is thus kept constantly open during concentrated thought; and as it seems to be a law of frequent (if not of universal) application that incidental stimuli tend to discharge through paths that are already

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in the mouth etc are examples from other senses of the same lapse into un consciousness of any too unchanging content — a lapse which Hobbes has ex pressed in the well known phrase *Semper idem sentire ac non sentire ad idem revertunt*

The cause of the unconsciousness is certainly not the mere blunting of the sense-organs Were the sensation important we should notice it well enough and we can at any moment notice it by expressly throwing our attention upon it [1] provided it have not become so inveterate that inattention to it is ingrained in our very constitution as in the case of the *muscæ volitantes* the double retinal images etc But even in these cases artificial conditions of observation and patience soon give us command of the impression which we seek The inat tentiveness must then be a habit grounded on higher conditions than mere sensorial fatigue

Helmholtz has formulated a general law of inattention which we shall have to study in the next chapter but one Helmholtz s law is that we leave all im pressions unnoticed which are valueless to us as signs by which to *discriminate things* At most such impressions fuse with their consorts into an aggregate effect The upper partial tones which make human voices differ make them differ as wholes only—we cannot dissociate the tones themselves The odors which form integral parts of the characteristic taste of certain substances meat fish cheese butter wine do not come as odors to our attention The various muscular and tactile feelings that make up the perception of the attributes wet elastic doughy etc are not singled out separately for what they are And all this is due to an inveterate habit we have contracted of passing from them immediately to their import and letting their substantive nature alone They have formed connections in the mind which it is now difficult to break they are constituents of processes which it is hard to arrest and which differ altogether from what the processes of catching the attention would be In the cases Helmholtz has in mind not only we but our ancestors have formed these habits In the cases we started from however of the mill wheel the spectacles the factory din the tight shoes etc the habits of inattention are more recent and the manner of their genesis seems susceptible hypothetically at least of being traced

How *can* impressions that are not needed by the intellect be thus shunted off from all relation to the rest of consciousness? Professor G E Muller has made a plausible reply to this question and most of what follows is borrowed from him [2] He begins with the fact that

When we first come out of a mill or factory in which we have remained long enough to get wonted to the noise we feel as if something were *lacking* Our total feeling of existence is different from what it was when we were in the mill A

[1] It must be admitted that some l ttl time will often elapse before this effort succeeds As a child I slept n a nursery with v r l d l t l

es now sl pi g in the country near a h d ceased t fl w but on looking out and then heard it too

friend writes to me: "I have in my room a little clock which does not run quite twenty-four hours without winding. In consequence of this, it often stops. So soon as this happens, I notice it, whereas I naturally fail to notice it when going. When this first began to happen, there was this modification: I suddenly felt an unexplained uneasiness or sort of void, without being able to say what was the matter, and only after some consideration did I find the cause in the stopping of the clock."

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discharging rather than through others the whole arrangement might protect the thought centres from interference from without Were this the tru
ale of these peculiar movement

... tainly a genuine and curious fact

Chapter XII

CONCEPTION

The Sense of Sameness

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The p
peculia
h h expressed *the same*

This *sense of sameness* is the very keel and backbone
saw in Chapter x how the consciousness of personal identity reposed on it the present thought finding in its memories a warmth and intimacy which it recog n es as the same warmth and intimacy it now feels This sense of identity of the knowing subject is held by some philosophers to be the only vehicle by which the world hangs together It seems hardly necessary to say that a sense of ident ty of the known object would perform exactly the same unifying func t on even if the sense of subjective dentity were lost And without the in tention to think of the same outer things over and over again and the sense that we were doing so our sense of our own personal sameness would carry us but a little way towards making a universe of our experience

Note however that we are in the first instance speaking of the sense of samene
the po
That is
or whether the mind be true or false its assumptions of it Our principle only lays it down that the mind makes continual use of the *not on* of sameness and if d pri ed of it would have a different structure from what it has In a word the pr nciple that the mind can mean the Same is true of its *mean gs* but not necessarily of aught besides[1] The mind must conceive as poss ble that the Same should be before it for our experience to be the so t of thing it is With out the psychological sense of identity sameness might rain down upon us from the outer world for ever and we be none the wiser With the psychological

Th re ar tw th principles f d tity in phil sophy Th *l l gical o s rts*

sense on the other hand the outer world might be an unbroken flux and yet we should perceive a repeated experience Even now the world may be a place in which the same thing never did and never will come twice The thing we
n top to bottom and we be ignorant of the
are not deceived our intention is to think
.ve given to the principle in calling it the law
of constancy in our meanings accentuates its subjective character and justifies us in laying it down as the most important of all the features of our mental structure

Not all psychic life need be assumed to have the sense of sameness developed in this way In the consciousness of worms and polyps though the same realities may frequently impress it the feeling of sameness may seldom emerge We however running back and forth like piders on the web they weave feel ourselves to be working over identical materials and thinking them in different ways And the man who identifies the materials most is held to have the most philosophic human mind

Conception Defined

The function by which we thus identify a numerically distinct and permanent subject of discourse is called CONCEPTION and the thoughts which are its vehicles are called *concepts* But the word concept is often used as if it stood for the object of discourse itself and this looseness feeds such evasiveness in discussion that I shall avoid the use of the expression concept altogether and speak of conceiving state of mind or something similar instead The word conception is unambiguous It properly denotes neither the mental state nor what the mental state signifies but the relation between the two namely the *function* of the mental state in signifying just that particular thing It is plain that one and the same mental state can be the vehicle of many conceptions can mean a particular thing and a great deal more besides If it has such a multiple conceptual function it may be called an act of compound conception

We may conceive realities supposed to be extra mental as steam-engine fictions as mermaid or mere *entia rationis* like difference or nonentity But whatever we do conceive our conception is of that and nothing else—nothing else that is *instead* of that though it may be of much else *in addition* to that. Each act of conception results from our attention singling out some one part of the mass of matter for thought which the world presents and holding fast to it without confusion [1] Confusion occurs when we do not know whether a certain

[1] In l ter chapters we shall see that determ nate relati s exist between the various d ta thus fixed upon by the mind These are called *a prio* or axiomatic relations Simple inspection of the data enables us to perceive them and one inspection is as effective as a mill on for engendering in us the con iction that between *those* data th t relation must always hold. To change the r lation we should have to m ke the data d ffe nt 'The g a tee fo the uniformity and adequacy' of the data can only be the m nd s ow power to fix up n ny objective c ntent and to mean that content as often as it likes Th s r ght of the mind to construct permanent ideal objects f r itself out of the data of exp ri ce seems si gularly enough to be a stumbling block to m ny Profes or R b rts n n his clear and instr cti e rticle Axioms in *The E cyclopæd a Brita c* (9th edition) s ggests that it may nly be where *movements* enter into the const tution f the id al obj ct (as they do n geometrical figures) that we can *make* the ultimate relations to be what for us they must be in ll cir

object proposed to us is the same with one of our meanings or not so that the conceptual function requires, to be complete that the thought should not only say I mean this but also say I don t mean that.

Each conception thus eternally remains what it is and never can become another The mind may change its states and its meanings at different times may drop one conception and take up another but the dropped conception can in no intelligible sense be said to *change into* its successor The paper a moment ago white I may now see to have been scorched black. But my conception white does not chan e into my conception black On the contrary it stays alongside of the objective blackness as a different meaning in my mind and by so doin lets me jud e the blackness as the paper s change Unless it stayed I should simply say blackness and know no more. Thus amid the flux of opinions and of physical things the world of conceptions or things intended to be thought about stands stiff and immutable, like Plato s Realm of Ideas.

Some conceptions are of things some of events some of qualities Any fact be it thing event, or quality may be concei ed sufficiently for purposes of identification if only it be sin led out and marked so as to separate it from other things Simply calling it this or that will suffice To speak in technical language a subject may be conceived by its *denotation* with no *connotation* or a very minimum of connotation attached The essential point is that it should be re-identified by us as that which the talk is about and no full representation of it is necessary for this even when it is a fully representable thing

In this sense, creatures extremely low in the intellectual scale may have conception All that is required is that they should recognize the same experience again A polyp would be a conceptual thinker if a feeling of hello! thingumbob again' ever flitted through its mind.

Most of the objects of our thought however are to some degree represented as well as merely pointed out. Either they are things and events perceived or imagined or they are qualities app ehended in a positive way Even where we ha e no intuitive acquaintance with the nature of a thing if we know any of the relations of it at all anything *about*
distinguish it from all the other thing
topics of discourse are thus *problemat*
We think of a thin *about* which certain facts must obtain but we do not yet

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cumstances. H makes, it is true, co cessi in f f co ceptions f umbe bstracted from "r *bjective occurren es succeeding each* ther in time because these also ar acts f construction, dependent th powe we ha f luntarily determining th flow f subjective consciousness. "The content f passive sensation, th th hand, "may indefinitely ary beyond any control f urs. What if t d vary so lo g as we can co tin to think of and mean th qualities it aried fr m? W can 'make ideal bjects for urselves t of irrecoverable bits f passi xperience quite as perfectly as t f easily repeatabl active experiences. And when w ha got ur bjects t ether and compared them w d ot mak but *find* their relations.

Cf Hodgso *T me nd Space* § 46 Lotze *Logik* §

For tho ,b man in fever should from sugar ha bitter taste, which t an ther time would produce weet ne, y t th idea f bitter in that man's mind w ld be as distinct as if he had tasted only gall. (Locke *Essay c. H man Under tanding* b. II, chap XI, § 3. Read the w ole section!)

know how the thing will look when it is realized Thus we conceive of a perpetual motion machine It is a *quæsitum* of a perfectly definite kind —we can always tell whether the actual machines offered us do or do not agree with what we mean by it The natural possibility or impossibility of the thing does not touch the question of its conceivability in this problematic way Round square black white thing are absolutely definite conceptions it is a mere accident as far as conception goes that they happen to stand for things which nature never lets us sensibly perceive [1]

Conceptions Are Unchangeable

The fact that the same real topic of discourse is at one time conceived as a mere that or that which etc and is at another time conceived with additional specifications has been treated by many authors as a proof that conceptions themselves are fertile and self developing A conception according to the Hegelizers in philosophy develops its own significance makes explicit what it implicitly contained passes on occasion over into its opposite and in short loses altogether the blankly self identical character we supposed it to maintain The figure we viewed as a polygon appears to us now as a sum of juxtaposed triangles the number hitherto conceived as thirteen is at last noticed to be six plus seven or prime the man thought honest is believed a rogue Such changes of our opinion are viewed by these thinkers as evolutions of our conception from within

The facts are unquestionable our knowledge does grow and change by rational and inward processes as well as by empirical discoveries Where the discoveries are empirical no one pretends that the propulsive agency the force that makes the knowledge develop is mere conception All admit it to be our continued exposure to the *thing* with its power to impress our senses Thus strychnin which tastes bitter we find will also kill etc Now I say that where the new knowledge merely comes from *thinking* the facts are essentially the same and that *to talk of self development on the part of our conceptions is a very bad way of stating the case* Not n n nsations as in the empirical in sable conditions of advance be examined it will be found I

[illegible] in sn pe of positive im ges in our mind As a matter of fact she *may* realize a w rm cold thing wh never two points of the skin so near together as not to be locally d stinguished are touched the one with a warm the other with a cold piece of metal The warmth and the cold are then often felt as if in the same objective place Under s m la conditions two obj cts one sha p and the othe blunt may feel like one sh rp blunt thing The same space may appe r of two colors if by optic l artifice one of the colors is made to ppear s if seen *th ugh* the other —Whether any two attributes whatever shall be compatible or not in the [illegible]

[illegible] this remark is the co fusion deliberately kept up by certain authors (e g Spencer *P ychology* §§ 426–7) between the inconceivable and the not-distinctly imaginable How d we know *wh ch* th ngs we cannot imagine unless by first conceiving them meaning *them* and not other things?

believe that the new truth affirms in every case a *relation* between the original subject of conception and some new subject conceived later on These new subjects of conception arise in various ways Every one of our conceptions is of something which our attention originally tore out of the continuum of felt experience and provisionally isolated so as to make of it an individual topic of discourse. Every one of them has a way if the mind is left alone with it of suggesting other parts of the continuum from which it was torn for conception to work upon in a similar way This suggestion is often no more than what we shall later k[illegible] [illegible]ment on of ideas. Often however it is a sort of in[illegible] tation to the [illegible] ever it is it brings n[illegible] may or may not exp[illegible] — old Thus I have a conception of equidistant lines Suddenly [illegible] whence there pops into my head the conception of their meeting Suddenly again I think of the meeting and the equidistance both together and perceive them incompatible *Those* lines will never meet I say Suddenly again the word parallel pops into my head They are parallels, I continue and so on Original conceptions to start with adventitious conceptions pushed forward by multifarious psychologic causes comparisons and combinations of the two resultant conceptions to end with which latter may be of either rational or empirical relations

As regards these relations they are conceptions of the second degree as one might say and their birthplace is the mind itself In Chapter XXVIII I shall at considerable length defend the mind s claim to originality and fertility in bringing them forth But no single one of the mind s conceptions is fertile *of itself* as the opinion which I criticise pretends When the several notes of a chord are sounded together we get a new feeling from their combination This feeling is due to the mind reacting upon that group of sounds in that determinate way and no one would think of saying of any single note of the chord that it developed of itself into the other notes or into the feeling of harmony So of Conceptions. No one of them develops into any other But if two of them are th[illegible]ght at once their *relation* may come to consciousness and form matter for a third conception

Take thirteen for example which is said to develop into prime What really happens is that we compare the utterly changeless conception of thirteen with various other conceptions those of the different multiples of two three four five and six and ascertain that it *differs* from them all Such difference is [illegible] freshly ascertained relation It is only for mere brevity's sake that we call it a property of the original thirteen the property of being prime We shall see in the next chapter that (if we count out æsthetic and moral relations between things) the only important relations of which the mere inspection of conceptions makes us aware are relations of comparison that is of difference and non-difference between them The judgment $6 + 7 = 13$ expresses the relation of *equality* between two ideal objects 13 on the one hand and $6 + 7$ on the other successively conceived and compared The judgments $6 + 7 > 12$ or $6 + 7 < 14$ express in like manner relations [illegible] equality between ideal objects. But if [illegible]t be unfair to say that the conception of $6+7$ generates that of 12 or of 14 surely [illegible]t is as unfair to say that it generates that of 13

know how the thing will look when it is realized Thus we conceive of a per petual motion machine It is a *quæsitum* of a perfectly definite kind —we can always tell whether the actual machines offered us do or do not agree with what we mean by it The natural possibility or impossibility of the thing does not touch the question of its conceivability in this problematic way Round square black white thing are absolutely definite conceptions it is a mere accident as far as conception goes that they happen to stand for things which nature never lets us sensibly perceive [1]

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For if the alleged cases of self development be examined it will be found I

[1] Black
the comb
lates as
matter o
together as not to be locally dist guished are touched the one with a warm the other with a c ld p ece of metal The wa mth and the cold are th n often f lt as if in the same objective place Under sim l r cond tions two bjects one sharp a d the other blunt may f el like one sharp blunt th ng The s me space m y appear of two colors if by optical artifice one of the col m d to an ear as if seen *th ough* the ther —Whether ny two attributes whatever sha
mo
Lot
as
Lep
and
by first conceiv ng them

Abstract' Ideas

We have now to pass to a less excusable mistake There are philosophers who deny that associated things can be broken asunder at all even provisionally by *the concei in mind*. The opinion known as Nominalism says that we really never frame any conception of the partial elements of an experience but are compelled whenever we think it, to think it in its totality just as it came.

I will be silent of mediæval Nominalism and begin with Berkeley who is supposed to have rediscovered the doctrine for himself His asseverations against abstract ideas are among the oftenest quoted passa es in philosophic literature

> It is agreed [h says] o all hands that the qualit es r *modes of things do never really exist each of them apart by* t.elf *and separated from all others* but are mix d, as it were, and blended together several in the same bje t But we a e told, the mind bein, able to c nsider each qualit sin ly or ab tracted f om those other qualities with which it is united does by that means frame to t.elf abstract deas After this manner t is said, we ome by th b tract idea of man or if ou please, humanity r human nature whe ein it is true there is included ol r because th re is n man but has some colo but then it can be either white, n r black r any particular colo because there is no one parti ular color wherein her s n luded tature but then it is neither tall
>
> s

pe ceived and f an usly ompounding and di ding them. hand, the eye the n se each by tself ab tracted or separated from *the rest of the* body B t then whatever hand r eye I imagine it must ha e some particular shape d ol r Likewise the idea of man that I frame t myself must be eithe of white r black r a tawny a straight r crook d, a tall or a low or a middle sized man I cannot by any effort of th ught co ei e the ab tract dea abo e described And it is equally impossible for me to form the bstract idea of m ti n

it d ffern *nerrtin from th* ther And if either mean to think all th t th ther t

tates of mind Some f these functi ns are th same with pr ious ones, some not. Any changed mini n, then, *par ly* contains new editi ns (absol tely identical with th ld, h w ver) of f me conceptions, *partly* absolutely new conceptions. The di ision is perfectly asy one to make in each particular case.

The conceptions of 12 13 and 14 are [illegible]

[illegible] all its parts This particular case is it seems to me the only case which makes the notion of one conception evolving into another sound plausible But even in this case the conception as such of the whole does not evolve into the conception as such of the parts Let the conception of some object as a whole be given first To begin with it points to and identifies for future thought a certain *that* The whole in question might be one of those mechanical puzzles of which the difficulty is to unlock the parts In this case, nobody would pretend that the richer and mo[illegible] we gain of [illegible] ep-tion of [illegible] It is true that as they both mean *that* sa[illegible] [illegible]ght and our [illegible] ception But [illegible] that same [illegible] the later thought is the vehicle of all those other conceptions which it took the manual experimentation to acquire Now it is just the same where the whole is mathematical instead of being mechanical Let it be a polygonal space which we cut into triangles and of which we then affirm that it *is* those triangles Here the experimentation (although usually done by a pencil in the hands) may be done by the unaided imagination We hold the space first conceived as polygonal simply in our mind s eye until our attention wandering to and fro within it has carved it into the triangles The triangles are a new conception the result of this new operation Having once conceived them however and compared them with the old polygon which we originally conceived and which we have never ceased conceiving we judge them to fit exactly into its area The earlier and later conceptions we say are of one and the same space But this relation between triangles and polygon which the mind cannot help finding if it compares them at all is very badly expressed by saying that the old conception has developed into the new New conceptions come from new sensations new movements new emotions new associations new acts of attention and new comparisons of old conceptions and not in other ways Endogenous prolification is not a mode of growth to which conceptions can lay claim

I hope therefore that I shall not be accused of huddling mysteries out of sight when I insist that the psychology of conception is not the place in which to treat of those of continuity and change Conceptions form the one class of entities that cannot under any circumstances change They can cease to be altogether or they can stay as what they severally are but there is for them no middle way They form an essentially discontinuous system and translate the process of our perceptual experience which is naturally a flux into a set of stagnant and petrified terms The very conception of flux itself is an absolutely changeless meaning in the mind it signifies just that one thing flux immovably —And with this the doctrine of the flux of the concept may be dismissed and need not occupy our attention again [1]

[1] Arguments seldom make converts in matt rs philosophical and some read rs I know who find that they co ce[illegible] e a certain matter differently from what they d d will still prefer

tained in the words I have italicized I am unacquainted with it The Berkeley an nominalism thus breaks down

It is easy to lay bare the false assumption which underl es the whole discus sion of the question as hitherl d on That assumption is that ideas in order to know must be cast in
and that the only things that c
The error has not been confine
tionem cognoscentis et cogn ti has been the maxim more or less explicitly assumed of writers of every hool Practically it amounts to saying that an idea must *be* a duplicate edit
only know itself—or more
the word as a self transcendent

Now our own blunt statements about the ultimateness of the cognitive relation and *the difference between the* object of the thought and its mere topic or subject of discourse (*cf* p 178 ff) are all at variance with any
re and more occasion as we advance in this

state of mind wh ch either acts upon the reality or resemb es
of thoughts which can with any show of plausibil ty be said to resemble their objects *are sensations The stuff of which all our other thoughts are composed* is symbolic and a thought attests its pertinency to a topic by simply *terminating* sooner or later in a sensation which resembles the latter

But M ll and the rest believe that a thought must *be* what it means and mean what it *is* and that if it be a picture of an entire individual it cannot mean any part of him to the exclusion of the rest I say nothing here of the preposterously false descriptive psychology involved in the statement that the only *things we can mentally picture are individuals completely determinate in all* regards Chapter XVIII will have something to say on that point and we can ignore t here For even if it were true that our images were always of concrete ind iduals it would not in the least follow that our meanings were of the same

The se se of our mean ng is an entirely peculiar element of the thought It is o e of those evanescent and transitive facts of m nd which introspection cannot turn round upon and isolate and hold up for examination as an ento

ing and dying processes too fa nt and complex to be traced The geometer w th his one defin te figure before him knows perfectly that his thoughts apply to co tless other figu es as well and that although he *sees* lines of a certain spe cial b gness direction color etc he *mea s* not one of these deta ls When I use the word *man* in two different sentences I may have both times exactly the same sound upon my lips and the same picture in my mental eye but I may mean and at the very moment of uttering the word and imagining the p cture

E.g. "Th kn wledg f things must mean th t th mind fi d ts lf in th m th t, in som w y th diff ence bet een them and th mind is diss l d (E. Caird *Philo phy f Kant* ted., p 553)

distinct from the body moving and which is neither swift nor slow curvilinear nor rectilinear and the like may be said of all other abstract general ideas whatsoever

And there is ground to think most men will acknowledge themselves to be in my case The generality of men which are simple and illiterate never pretend to abstract notions It is said they are difficult and not to be attained without pains and study

Now I would fain know at what time it is men are employed in surmounting that difficulty and furnishing themselves with those necessary helps for discourse It can not be when they are grown up for then it seems they are not conscious of any such painstaking it remains therefore to be the business of their childhood And surely the great and multiplied labor of framing abstract notions will be found a hard task for that tender age Is it not a hard thing to imagine that a couple of chil dren cannot prate together of their su ar plums and rattles and the rest of their little trinkets till they have first tacked together numberless inconsistencies and so framed in their minds abstract general ideas and annexed them to every common name they make use of?[1]

The note so bravely struck by Berkeley could not however be well sus tained in face of the fact patent to every human being that we *can* mean color without meaning any particular color, and stature without meaning any partic ular height James Mill to be sure chimes in heroically in the chapter on Classification of his *Analysis* but in his son John the nominalistic voice has grown so weak that although abstract ideas are repudiated as a matter of traditional form the opinions uttered are really nothing but a conceptualism ashamed to call itself by its own legitimate name[2] Conceptualism says the mind can conceive any quality or relation it pleases and mean nothing but it in isolation from everything else in the world This is of course the doctrine which we have professed John Mill says

The formation of a Concept does not consist in separating the attributes which are said to compose it from all other attributes of the same object and enabling us to conceive those attributes disjoined from any others We neither conceive them nor think them nor cognize them in any way as a thing apart but solely as forming in combination with numerous other attributes the idea of an individual object. But though meaning them only as part of a larger agglomeration we have the power of fixing our attention on them to the neglect of the other attributes with which we think them combined *While the concentration of attention lasts if it is sufficiently int nse we may be temporarily unconscious of any of the other attributes and may really for a brief interval have nothing present to our mind but the attributes con stituent of the concept* General concepts therefore we have properly peaking none we have only complex ideas of objects in the concrete but we are able to *attend exclusively to certain parts* of the concrete idea and by that *exclusive atten tion* we enable those parts to *determine exclusively the course of our thoughts* as sub sequently called up by association and are in a condition to carry on a train of medi tation or reasoning relating to those parts only *exactly as if* we were able to *conceive* them separately from the rest[3]

This is a lovely example of Mill s way of holding piously to his general state ments but conceding in detail all that their adversaries ask If there be a better description extant of a mind in possession of an abstract idea than is con

[1] *Principles of Human Knowledge* Introd ct n §§ 10 14
[2] *Conceptualisme ho teux* R b r *Psych l g e* p 310
[3] *Examinat on of Hamilt n* p 393 *Cf* also *Logic* bk II chap v § 1 and bk IV chap II, § 1

tained in the words I have italicized I am unacquainted with it. The Berkeleyan nominalism thus breaks down.

It is easy to lay bare the false assumption which underlies the whole discussion of the question as hitherto carried on. That assumption is that ideas, in order to know, must be cast in the exact likeness of whatever things they know, and that the only things that can be known are those which ideas can resemble. The error has not been confined to nominalists. *Omnis cognitio fit per assimilationem cognoscentis et cogniti* has been the maxim more or less explicitly assumed of writers of every school. Practically it amounts to saying that an idea must *be* a duplicate edition of what it knows—in other words, that it can only know itself—or, more shortly still, that knowledge in any strict sense of the word, as a self-transcendent function, is impossible.*

Now our own blunt statements about the ultimateness of the cognitive relation, and the difference between the "object" of the thought and its mere topic or subject of discourse (cf. p. 1 8 ff.), are all at variance with any such theory, and we shall find more and more occasion as we advance in this book to deny its general truth. All that a state of mind need do, in order to take cognizance of a reality, intend it, or be "about" it, is to lead to a remoter state of mind which either acts upon the reality or resembles it. The only class of thoughts which can with any show of plausibility be said to resemble their objects are sensations. The stuff of which all our other thoughts are composed is symbolic, and a thought attests its pertinency to a topic by simply *terminating* sooner or later in a sensation which resembles the latter.

But Mill and the rest believe that a thought must *be* what it means, and mean what it *is*, and that if it be a picture of an entire individual, it cannot mean any part of him to the exclusion of the rest. I say nothing here of the preposterously false descriptive psychology involved in the statement that the only things we can mentally picture are individuals completely determinate in all regards. Chapter XVIII will have something to say on that point, and we can ignore it here. For even if it were true that our images were always of concrete individuals, it would not in the least follow that our meanings were of the same.

The sense of our meaning is an entirely peculiar element of the thought. It is one of those evanescent and "transitive" facts of mind which introspection cannot turn round upon, and isolate and hold up for examination, as an entomologist passes round an insect on a pin. In the (somewhat clumsy) terminology I have used, it pertains to the "fringe" of the subjective state, and is a "feeling of tendency," whose neural counterpart is undoubtedly a lot of dawning and dying processes too faint and complex to be traced. The geometer, with his one definite figure before him, knows perfectly that his thoughts apply to countless other figures as well, and that although he *sees* lines of a certain special bigness, direction, color, etc., he *means* not one of these details. When I use the word *man* in two different sentences, I may have both times exactly the same sound upon my lips and the same picture in my mental eye, but I may mean, and at the very moment of uttering the word and imagining the picture

* E.g. "The knowledge of things must mean that the mind finds itself in them, or that, in some way the difference between them and the mind is dissolved." (E. Caird, *Philosophy of Kant*, 1st ed., p. 553.)

know that I mean, two entirely different things Thus when I say What a wonderful man Jones is! I am perfectly aware that I mean by man to exclude Napoleon Bonaparte or Smith But when I say What a wonderful thing Man is! I am equally well aware that I mean to *include* not only Jones but Napoleon and Smith as well This added consciousness is an absolutely positive sort of feeling transforming what would otherwise be mere noise or vision into something *understood* and determining the sequel of my thinking the later words and images in a perfectly definite way We saw in Chapter IX that the image *per se* the nucleus is *functionally* the least important part of the thought *Our doctrine therefore of the fringe leads to a perfectly satisfactory decision of the nominalistic and conceptualistic controversy* so far as it touches psychology *We must decide in favor of the conceptualists* and affirm that the power to think things qualities relations or whatever other elements there may be isolated and abstracted from the total experience in which they appear is the most indisputable function of our thought

Universals

After abstractions, universals! The fringe which lets us believe in the one lets us believe in the other too An individual conception is of something

it is a perfectly definite conception a self identical quality which I may mean again but as I have not yet individualized it by expressly meaning to restrict it to this particular snow nor thought at all of the possibility of other things to which it may be applicable it is so far nothing but a that a floating adjective as Mr Bradley calls it or a topic broken out from the rest of the world Properly it is in this state a singular—I have singled it out and when later I universalize or individualize its application and my thought turns to mean either *this* white or *all possible* whites I am in reality meaning two new things and forming two new conceptions [2] Such an alteration of my meaning has nothing to do with any change in the image I may have in my mental eye but solely with the vague consciousness that surrounds the image of the sphere to which it is intended to apply We can give no more definite account of this vague consciousness than has been given on pp 161–72 But that is no reason for denying its presence [3]

[1] The trad tional conceptualist doctrine is that an abstract must *eo ipso* be a uni ersal Even modern and independent authors l ke Prof Dewey (*Psychology* p 207) obey the tra dit on The mind seizes upon some one a pect bstracts or prescinds it This very se ure of some one lement generalizes the one abst cted Atte t on in drawing it f rth makes it a distinct cont nt f consciousn s and thus u iversalizes it it is considered no longer in its particular connection with the object but on its own cc unt that is as an ide or what it s gn fies to the mind a d s g ificance is always uni ersal

[2] C F Reid *Intellectual Powers* Essay v ch p III —*Wh te ss* is one thing *the wh te ess of this sheet of paper* another thing

[3] Mr F H

tent cut off

not be correc

But the nominalists and traditional conceptualists find matter for an inveterate quarrel in these simple facts. Full of their notion that an idea, feeling, or state of consciousness [illegible] aware of its own quality, and agreeing, as they both d[illegible] fectly determinate singu[illegible] ceive how it should become the vehicle of a knowledge of anything [illegible] universal. To know a universal it must be universal, for like can only be known by like, etc. Unable to reconcile these incompatibles, the knower and the known, each side immolates one of them to save the other. The nominalists settle the hash of the thing known by denying it to be ever a genuine universal; the conceptualists despatch the knower by denying it to be a state of mind in the sense of being a perishing segment of thoughts' stream, consubstantial with other facts of sensibility. They invent instead of it, as the vehicle of the knowledge of universals, an *actus purus intellectus*, or an Ego, whose function is treated as quasi-miraculous and nothing if not awe-inspiring, and which it is a sort of blasphemy to approach with the intent to explain and make common, or reduce to lower terms. In [illegible] ed[illegible]e of universals, the higher [illegible] cle of all thinking, whatever [illegible] in every thought. The nominalists meanwhile, who dislike *actus puros* and awe-inspiring principles and despise the reverential mood, content themselves with saying that we are mistaken in supposing we ever get sight of the face of an universal, and that what deludes us is nothing but the swarm of individual ideas which may at any time be awakened by the hearing of a name.

If we open the pages of either school, we find it impossible to tell, in all the whirl about universal and particular, when the author is talking about universals in the mind, and when about objective universals, so strangely are the two mixed together. James Ferrier, for example, is the most brilliant of anti-nominalist writers. But who is nimble-witted enough to count, in the following sentences from him, the number of times he steps from the known to the knower, and attributes to both whatever properties he finds in either one?

sa[illegible]

[illegible] characterizes all the phenomena of mere sensation. To grasp the nature of this universality is not easy. Perhaps the best means by which this end may be compassed is by contrasting it with the particular. It is not difficult to understand that a sensation, a phenomenon of sense, is never more than the particular which it is. As such, that is, in its strict particularity, it is absolutely unthinkable. In the very act of being thought, something more than it emerges, and this something more cannot be again the particular. [illegible] Ten particulars *per se* cannot be thought of any more than one particular can be thought of [illegible] there always emerges in thought an additional some-

[illegible] and where we deny that description would not be applicable. This seems to be the same doctrine as [illegible] the application to one [illegible] to all subjects of the abstract [illegible] conceived ([illegible] its individuality or its universality) constituting a new conception. I am, however, not quite sure that Mr. Bradley steadily maintains this ground. *Cf.* the first chapter of his *Principles of Logic*. The doctrine I defend is st[illegible]tly [illegible]held in Rosmini's *Philosophical System*, Introduction by Thomas Davidson, p. 43 (London, [illegible]88).

thing which is the possibility of other particulars to an indefinite extent The indefinite additional something which they are instances of is a universal The idea or universal cannot possibly be pictured in the imagination for this would at once reduce it to the particular This inability to form any sort of picture or representation of an idea does not proceed from any imperfection or limitation of our faculties but is a quality inherent in the very nature of intelligence A contradiction is involved in the supposition that an idea or a universal can become the object either of sense or of the imagination An idea is thus diametrically opposed to an ima e[1]

The nominalists, on their side admit a *quasi* universal om th σ h h m

knower or a known The authors themselves do not distinguish They want to get something in the mind which shall *resemble* what is out of the mind however vaguely and they think that when that fact is accomplished, no farther questions will be asked James Mill writes [2]

The word man we shall say is first applied to an individual it is first associated with the idea of that individual and acquires the power of calling up the idea of him it is next applied to another individual and acquires the power of calling up the idea of him so of another and another till it has become associated with an indefinite number and has acquired the power of calling up an indefinite number of those ideas indifferently What happens? It does call up an indefinite number of the ideas of individuals as often as it occurs and calling them in close connection it forms a species of complex idea of them It is also a fact that when an idea becomes to a certain
it *comprehends* it is of necessity
been a main cause of the mystery
pears that the word *man* is not a
of the realists nor a word having
no idea at all as was that of the [earlier] nominalists but a word calling up an indefinite number of ideas by the irresistible laws of association and forming them into one very complex and indistinct but not therefore unintelligible idea

Berkeley had already said [3]

A word becomes general by being made the sign not of an abstract general idea but of many several particular ideas any one of which it indifferently suggests to the mind An idea which considered in itself is particular becomes general by being made to represent or stand for all other particular ideas of the same sort.

Stand for not *know* becomes general not becomes *aware of something general* particular ideas not particular *things*—everywhere the same timid
ully impotent attempt to
ne fact to be conceived be
s of a class then it is assumed that if we can only get enough ideas to huddle together for a moment in the mind the *being* of each several one of them there will be an equivalent for the *knowing* or *meaning* of *one* member of the class in question and their num

[1] *Lect es on G ek Ph losophy* pp 33 39 [2] *A alys s* chap VIII.
[3] *Principles of Human Knowledge* Introduction §§ 11 12

ber will be so large as to confuse our tally and leave it doubtful whether all the possible members of the class have thus been satisfactorily told off or not.

Of course this is nonsense. An idea neither is what it knows nor knows what it is; nor will swarms of copies of the same idea recurring in stereotyped form or by the irresistible laws of association formed into one idea ever be the same thin[illegible] as a thought of 'all the possible members' of a class. We must mean *that* by an alto[illegible] th[illegible]t of consciousness *ad hoc*. But it is easy to translate Berkeley's Hu[illegible] terms and so to make t[illegible] the doctrine of these aut[illegible] vehicle of universal con[illegible] stand for some special n[illegible] processes might have for its conscious correlate a psych[illegible] be just that universal meaning or intention that the name or mental picture employed should mean all the possible individuals of the class. Every peculiar complication of brain-processes must have some peculiar correlate in the soul. To one set of processes will correspond the thought of an indefinite taking of the extent of a word like *man*; to another set that of a particular taking; and to a third set that of a universal takin[illegible] of the extent of the same word. The thought corresponding to either set of processes is always itself a unique and singular event, whose dependence on its peculiar nerve-process I of course am far from professing to explain.

It may add to the [illegible]ffect [illegible] the text to quote [illegible] passage f[illegible]m the essay [by William James] in *Mind* J[illegible]uary [illegible]884.

[illegible] *man* meant for *that* man, to wit, J[illegible]hn Smith alone. N[illegible]t that the differ[illegible]

[illegible] either sharp imag[illegible] blurred imag[illegible] depends [illegible] its being felt with its [illegible] This functi[illegible] is the mysterious *plus*, the understood *meaning*. B[illegible]t *it is nothing applied to* the imag[illegible] from above no pur[illegible] act [illegible] [illegible] inhabiting [illegible] persensible and sem[illegible] pernatural plane. It can be diagrammatized as continuous with all the [illegible] the segments [illegible] the s[illegible]bj[illegible]cti[illegible] [illegible]t[illegible]eam. It is just that stirring fringe, [illegible] halo [illegible] [illegible]bscurity [illegible] [illegible]lation to masses [illegible] [illegible]ther imagery about to come, but not yet distinctly in focus, which we ha[illegible]e so abundantly set f[illegible]rth [in Chapte[illegible] [illegible] [illegible] this book].

If the image come unfringed, it reveals but [illegible] simple quality thing, [illegible] event [illegible] if it come fringed, it may [illegible]eveal something exp[illegible]essly taken uni[illegible]ersally [illegible] in [illegible] scheme [illegible] [illegible]lati[illegible]ns. Th[illegible] difference betwe[illegible] thought [illegible]nd feeling thus reduces itself in th[illegible] last [illegible]bjectiv[illegible] [illegible]nalysis, to the presence [illegible] absence [illegible] fringe. And this in turn [illegible]educes itself with much p[illegible]ob[illegible]b[illegible]lity in the last physiological analysis, to the absence [illegible] presence [illegible] [illegible]b-excitements in [illegible]ther co[illegible]o[illegible]lutions [illegible] the brain than those whose discharges unde[illegible]lie the mo[illegible] definite nucleus th[illegible] [illegible]ub[illegible]stantiv[illegible] ingredient, [illegible] the th[illegible]o[illegible]ght,—in this instance, the word [illegible] ima[illegible] [illegible]t may happen to arouse.

"The contrast is not, then, as the Platonists would ha[illegible] it, betwe[illegible] certain subjecti[illegible] facts called images and sensations, [illegible]nd [illegible]thers called acts [illegible] [illegible]elating intelligence, the f[illegible]rmer bei[illegible]g blind perva[illegible]ing things, knowing not even their [illegible]wn existence as [illegible]uch whilst the latter com[illegible]bine the poles in the mysterious [illegible]ynthesis [illegible] their cogni[illegible] [illegible]sweep. The co[illegible]trast is [illegible]eally be[illegible]t[illegible]een t[illegible] [illegible] [illegible]ects in which all mental facts without exception may be taken, their struc-

thing which is the possibility of other particulars to an indefinite extent The indefinite additional something which they are instances of is a universal The idea or universal cannot possibly be pictured in the imagination for this would at once reduce it to the particular This inability to form any sort of picture or representation of an idea does not proceed from any imperfection or limitation of our faculties but is a quality inherent in the very nature of intelligence A contradiction is involved in the supposition that an idea or a universal can become the object either of sense or of the imagination An idea is thus diametrically opposed to an image.[1]

The nominalists on their side admit a *quasi* universal something which we think *as if it were* universal though it is not and in all that they say about this something which they explain to be an indefinite number of particular ideas the same vacillation between the subjective and the objective points of view appears The reader never can tell whether an idea spoken of is supposed to be a knower or a known The authors themselves do not distinguish They want to get something in the mind which shall *resemble* what is out of the mind however vaguely and they think that when that fact is accomplished, no farther questions will be asked James Mill writes [2]

of complex idea of them It is also a fact that when an idea becomes to a certain extent complex from the multiplicity of the ideas it *comprehends* it is of necessity indistinct and this indistinctness has doubtless been a main cause of the mystery which has appeared to belong to it It thus appears that the word *man* is not a word having a very simple idea as was the opinion of the realists nor a word having no idea at all as was that of the [earlier] nominalists but a word calling up an indefinite number of ideas by the irresistible laws of association and forming them into one very complex and indistinct but not therefore unintelligible idea

Berkeley had already said [3]

A word becomes general by being made the sign not of an abstract general idea but of many several particular ideas any one of which it indifferently suggests to the mind An idea which considered in itself is particular becomes general by being made to represent or stand for all other particular ideas of the same sort.

Stand for not *know* becomes general not becomes *aware of something* general particular ideas not particular *things*—everywhere the same timidity about begging the fact of knowing and the pitifully impotent attempt to foist it in the shape of a mode of *being* of ideas If the fact to be conceived be the indefinitely numerous actual and possible members of a class then it is assumed that if we can only get enough ideas to huddle together for a moment in the mind the *being* of each several one of them there will be an equivalent for the *knowing* or *meaning* of *one* member of the class in question and their num

[1] *Lectures on Greek Philosophy* pp 33-39 [2] *Analysis* chap VIII.
[3] *Principles of Human Knowledge* Introduction §§ 11 12

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translate Berkeley s Hume s and [illegible]
term and so to make them stand m thin real and in this sense I think the doctrine of these authors less
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It may add t the ffect f the text to quot passage from the essay [by William James] in *Mind* January

"Why may we
does correspond t
nalists that all m
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mere noise, or from man meant t [illegible] man, to wit, [illegible]
en [illegible] th f ct th t when t ken universally the w rd has one f Mr Gal
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m
e
This [illegible] is [illegible] mysterious [illegible]
th image from above, no pure act f reaso inhabiting supersensibl and semi-supernatural plane It can be diagrammatized as co tinuous with all the other segments f the subjective stream. It is just that stamming, fringe, halo f bscurity felt relation to masses f th imagery about t come, but not yet distinctly in focus, which we ha so abundantly set f h [illegible] book]

arouse.

"The contrast is not, then, as the Plat nists w uld have it, between certain subjecti f cts called images and sensations and thers called cts f relating intelligence th former being blind perishing things, kn wing t even their wn existence as such, whilst the latter com bine the poles in the mysteri us ynthesis f their gnitive sweep. Th co trast is really be tween tw aspects in which all mental facts witho t exception may be taken their struc-

Truly in comparison with the fact that every conception whatever it be of is one of the mind s immutable possessions the question whether a single thing or a whole class of things or only an unassigned quality, be meant by it is an insignificant matter of detail Our meanings are of singulars particulars indef inites and universals mixed together in every way A singular individual is as much *conceived* when he is isolated and identified away from the rest of the world in my mind, as is the most rarefied and universally applicable quality he may possess—*being* for example when treated in the same way [1] From every point of view, the overwhelming and portentous character ascribed to universal conceptions is surprising Why from Plato and Aristotle downwards philosophers should have vied with each other in scorn of the knowledge of the partic ular and in adoration of that of the general is hard to understand seeing that the more adorable knowledge ought to be that of the more adorable things and that the *things* of worth are all concretes and singulars The only value of uni

sion to all the instances of a kind and the mere mystery as such of the knowl edge is equally great whether generals or singulars be the things known In sum therefore the traditional universal worship can only be called a bit of per verse sentimentalism a philosophic idol of the cave

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is as good knowing in the one case as in the oth r Concept and image thus discriminat d through their objects are consubstantial in their inward nature as modes of feeling The one as particular will no longer be held to be a relatively base sort of entity to be tak n as a matter of course whilst the other as universal is celebrated as a sort of standing m racle to be ador d but not explained. Both co cept and im ge *qua* subjective are singular and particular Both are moments of the st eam wh ch come and in an instant are no more The w d universality h s no meaning as appl ed to the r psychic body or structure which is always finite It only has a meaning when applied to their use import or reference to the k nd f b ect th v m rr l The r sentation as such of the u ersal object is as p r
all
have the same
pp 18–19)

[1] Hodgson *Time and Space* p 404.

It may seem hardly necessary to add (what follows as a matter of course from pp 149-54 and what has been implied in our assertions all along) that *nothing can be conceived twice over without being conceived in entirely different states of mind* Thus my arm-chair is one of the things of which I have a conception I knew it yesterday and recognized it when I looked at it But if I think of it t v 3 the same arm-chair which I looked at yesterday it is obvious that the n additional complication to the

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which we know that we mean the same thing are apt to be very different inueed from each other We think the thing now in one context now in another now in a definite image now in a symbol Sometimes our sense of its identity pertains to the mere fringe sometimes it involves the nucleus of our thought. We never can break the thought asunder and tell just which one of its bits is the part that lets us know which subject is referred to but nevertheless we always *do* know which of all possible subjects we have in mind Introspective psychology must here throw up the sponge the fluctuations of subjective life are too exquisite to be arrested by its coarse means It must confine itself to bearing witness to the fact that all sorts of different subjective states do form the vehicle by which the same is known and it must contradict the opposite view

The ordinary psychology of ideas constantly talks as if the vehicle of the same thin known must be the same recurrent state of mind and as if the having over again of the same idea were not only a necessary but a sufficient con d rice But this recurrence of the same idea

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ments A succession of judgments may all be about the same thing practical postulate which encourages us to keep thinking at all is that by going on to do so we shall jud e better *of the same thi gs* than if we do not In the successive judgments all sorts of new operations are performed on the things a m brought out without the sense of the main top c e er

the Same

The distinction between ha ing and operating is as natural in the mental as in the material wo ld As our hands may hold a bit of wood and a knife and yet do naught with e ther so our mind may simply be aware of a thing s existence and y t neither attend to it nor discriminate t ne ther locate nor count nor compare

Compare the admirabl passag in H dgso T m nd Space p 3 o.

nor like nor dislike nor deduce it nor recognize it articulately as having been met with before At the same time we know that instead of staring at it in this entranced and senseless way we may rally our activity in a moment and locate class compare count and judge it There is nothing involved in all this which we did not postulate at the very outset of our introspective work realities namely *extra mentem* thoughts and possible relat on of [illegible]

[illegible] which I pick out and proceed to define as a pebble which is not thereby torn from its mere time- and space neighbors and thought in conjunction with things physically parted from it by the width of nature Compare the form in which facts appear in a text book of physics as logically subordinated laws with that in which we naturally make their acquaintance The conceptual scheme is a sort of sieve in which we try to gather up the world s contents Most facts and relations fall through its meshes being either too subtle or insignificant to be fixed in any conception But whenever a physical reality is caught and identified as the same with something already conceived it remains on the sieve and all the predicates and relations of the conception with which it is identified become its predicates and relations too it is subjected to the sieve s network in other words Thus comes to pass what Mr Hodgson calls the translation of the perceptual into the conceptual order of the world[1]

In [illegible]

sake [illegible]

a bit of sensible experience is really nothing but a teleological instrument *This whole function of conceiving of fixing and holding fast to meanings has no significance apart from the fact that the conceiver is a creature with partial purposes and private ends* There remains therefore much more to be said about conception but for the present this will suffice

[1] *Philosophy of Reflection* I pp 273–308

Chapter XIII

DISCRIMINATION AND COMPARISON

It is matter of popular observation that some men have sharper senses than others and that some have acuter minds and are able to plit hairs and see two shades of meaning where the majority see but one Locke long ago set apart the faculty of discrimination as one in which men differ individually What he wrote is good enough to quote as an introduction to this chapter

> Another faculty we may take otice of in our minds is that of discerning and distinguishing betw en the se eral ideas it has It is not enough to have a confused perceptio of something in general unless the mind had a distinct perception of different objects and their qualities it would be capable of very little knowled,e though the bodies that affect us were as busy about us as they are now and the mind were continually empl yed in thinking On this faculty of distinguishing one thing from an den d rta nty f s ve al e en very general propos tions
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> tempers I will n t h e examine t suffices to take otice that this is one of the p atı ns that the mind m y reflect on nd observe in itself It is of that co sequence t ts ther knowledge th t so f as this faculty s in tself dull or not rightly made u of fo the di tingui hing on thing f om another so far our notions are confused and ur reas and judgment disturbed o misled. If in ha in, our deas in the memory eady at hand cons ts quickness of parts in this of ha ing them unc nfused and b g abl m ely to distinguish o e thing f om an ther where there is b t the least diff en e consi ts in a great measu e the exact ess of judgment and clearness of eason hi h is to be ob rved in man bo another And hence perhap may b gi en some eas of th t common observ tio —that men who have a g eat deal of wit and p mpt mem n s ha e not al ay the clearest j dgment or deepest rea so F wit lying most in the as emblage of ideas and putting tho e together with quickness and riety wherein can be found a y resemblance or co gruity thereby
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> and by affin ty to take o e thing for anoth r This s a way of proceeding quite contrary to metapho and allusio wh ein for the most p rt lies that entertainment and pl asantry f w t which trikes so h ely the f y d therefo e so cceptable to all pe pl because ts beauty appears at first sight and there is equi ed no labor of thought t examin what truth or reaso th e is in it.[1]

But Locke s descendants have been slow to enter into the path whose fruitfulness was thus po nted out by their master and have so neglected the study of

[1] *Ess y c H ma Und t ndi g* bk ii, ch xi, § 2

discrimination that one might almost say that the classic English psychologists have as a school hardly recognized it to exist Association has proved itself in their hands the one all absorbing power of the mind Dr Martineau in his review of Bain makes some very weighty remarks on this onesidedness of the Lockian school Our mental history says he is in its view,

a perpetual formation of new compounds and the words association cohesion fusion indissoluble connection all express the change from plurality of data to some unity of result An explanation of the process therefore requires two things a true enumeration of the primary constituents and a correct statement of their laws of combination just as in chemistry we are furnished with a list of the simple elements and then with the principles of their synthesis Now the latter of these two conditions we find satisfied by the association psychologists but not the former They are not agreed upon their catalogue of elements or the marks by which they may know the simple from the compound The psychologic unit is not fixed that which is called one impression by Hartley is treated as half a dozen or more by Mill and the tendency of the modern teachers on this point is to recede more and more from the better chosen track of their master Hartley for example regarded the whole present effect upon us of any single object—say an orange—as a single sensation and the whole vestige it left behind as a single idea of sensation His modern disciples on the other hand consider this same effect as an aggregate from a plurality of sensations and the ideal trace it leaves as highly compound The idea of an object instead of being an elementary starting point with them is one of the elaborate results of repetition and experience and is continually adduced as remarkably illustrating the fusing power of habitual association Thus James Mill observes

It is to this great law of association that we trace the formation of our ideas of what we call external objects that is the ideas of a certain number of sensations received together so frequently that they coalesce as it were and are spoken of under the idea of unity Hence what we call the idea of a tree the idea of a stone the idea of a horse the idea of a man In using the names tree horse man the names of what I call objects I am referring and can be referring only to my own sensations in fact therefore only naming a certain number of sensations regarded as in a particular state of combination that is concomitance Particular sensations of sight of touch of the muscles are the sensations to the ideas of which color extension roughness hardness smoothness taste smell so coalescing as to appear one idea I give the name of the idea of a tree [1]

To precisely the same effect Mr Bain remarks

External objects usually affect us through a plurality of senses The pebble on the sea shore is pictured on the eye as form and color We take it up in the hand and repeat the impression of form with the additional feeling of touch Knock two together and there is a characteristic sound To preserve the impression of an object of this kind there must be an association of all these different effects Such association when matured and firm is our idea our intellectual grasp of the pebble Passing to the organic world and plucking a rose we have the same effects of form to the eye and hand color and touch with new effects of odor and taste A certain time is requisite for the coherence of all these qualities in one aggregate so as to give us for all purposes the enduring image of the rose When fully acquired any one of the characteristic impressions will revive the others the odor the sight the feeling of the thorny stalk—each of these by itself will hoist the entire impression into the view [2]

Now this order of derivation making our objective knowledge begin with plurality of impression and arrive at unity we take to be a complete inversion of our psycho-

[1] *Analysis* vol. i p 71 [2] *The Senses and the Intellect* p 411

logical history Hartley, we think, was perfectly right in taking no notice of the number of inlets through which an object delivers its effect upon us, and, in place of this circumstance, treating the effect as one. Even now, after life has read us so many analytic lessons, in proportion as we can fix the attitude of our scene and our selves, the sense of plurality in our impressions retreats, and we lapse into an undivided consciousness: losing, for instance, the separate notice of any uniform hum in the ear or light in the eye, or weight of clothes on the body; though not one of them is inoperative on the complex ... once granted, must be carried far beyond Hartley's po... tegrally before it shells off int... engage for its object after ob... and even our self-detachment ... of collision between the force we issue and that which ... selves to the simplest case: when a red ivory ball, seen for the first time, has been withdrawn, it will leave a mental representation of itself, in which all that it simultaneously gave us will indistinguishably coexist. Let a white ball succeed to it; now, and not before, will an attribute detach itself, and the colour, by force of contrast, be shaken out into the foreground. Let the white ball be replaced by an egg, and this new difference will bring the form into notice from its previous slumber. And thus, that which began by being simply an object, cut out from the surrounding scene, becomes for us first a red object, and then a red round object, and so on. Instead, therefore, of the qualities, as separately given, subscribing together and adding themselves up to present us with the object as their aggregate, the object is beforehand with them, and from its integrity delivers them out to our knowledge one by one. In this disintegration the primary whole never loses its substantive character or name, whilst the difference which it throws off appears as a mere attribute, expressed by an adjective. Hence it is that we are compelled to think of the object as *having*, not as *being*, its qualities, and can never heartily admit the belief of any loose lot of attributes really fusing themselves into a *thing*. The unity of the original whole is not fated to go to pieces and be resolved into the properties which it successively gives off: it retains a residuary existence, which constitutes it *this one* as against the emerging quality which is only its *phenomenal predicate*. Were it not for this perpetual process of differentiation of self from the world, of object from its scene, of attribute from object, no step of Abstraction could be taken; no qualities could fall under our notice; and had we ten thousand senses, they would all converge and meet in but one consciousness. But if this be so, it is an utter falsification of the order of nature to speak of sensations grouping themselves as aggregates, and so composing for us the objects of which we think; and the whole language of this theory in regard to the field of synchronous existences is a direct inversion of the truth. Experience proceeds and in effect is trained, not by Association, but by *Dissociation*; not by reduction of pluralities of impressions to one, but by the opening out of one into many; and a true psychological history must expound itself in analytic rather than synthetic terms. Precisely those ideas—of Substance, of Mind, of Cause, of Space—which this system treats as minutely complex, the last result of myriads of confluent elements, are in truth the residuary simplicities of consciousness, whose stability the eddies and currents of phenomenal experience have left undisturbed.

The truth is that Experience is trained by *both* association and dissociation, and that psychology must be writ *both* in synthetic and in analytic terms. Our original sensible totals are, on the one hand, subdivided by discriminative attention, and, on the other, united with other totals,—either through the agency of

Essays Philosophical and Theological, First Series, pp. 68–73.

our own movements carrying our senses from one part of space to another or because new objects come successively and replace those by which we were at first impressed The simple impression of Hume the simple idea of Locke are both abstractions never realized in experience Exp
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[illegible] except what must What makes impressions separate we have to study in this chapter Although they separate easier if they come in through distinct nerves yet distinct nerves are not an unconditional ground of their discrimination as we shall presently see The baby assailed by eyes ears nose skin and entrails at once feels it all as one great blooming buzzing confusion and to the very end of life our location of all things in one space is due to the fact that the original extents or bignesses of all the sensations which came to once coalesced togeth [illegible]

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[illegible] ust have seen and heard [illegible] en *gaps*—but we these steps they must have been operative upon our minds just as they are now only *unconsciously* or at least *inattentively* Our first unanalyzed sensation was really composed of these elementary sensations our first rapid conclusion was really based on these intermediate inferences all the while only we

[1] Montgomery in *M nd* x p 527 Cf also Lipps *G undtatsa hen des S l lebens* p 579 ff and see below Chapter XIX.

failed to note the fact. But this is nothing but the fatal 'psychologists' fallacy' (p. 128) of treating an inferior state of mind as if it must somehow know implicitly all that is explicitly known *about the same topic* by superior states of mind. The thing thought of is unquestionably the same, but *it is thought twice* over in two absolutely different psychoses—once as an unbroken unit, and again as a sum of discriminated parts. It is not one thought in two editions, but two entirely distinct thoughts of one thing. And each thought is within itself a *continuum*, a *plenum*, needing no contributions from the other to fill up its gaps. As I sit here, I think objects, and I make inferences, which the future is sure to analyze and articulate and riddle with discriminations, shown in me many things wherever I now notice one. Nevertheless my thought feels quite sufficient unto itself for the time being, and ranges from pole to pole as free and as unconscious of having overlooked anything as if it possessed the greatest discriminative enlightenment. We all cease analyzing the world at some point, and notice no more differences. The last units with which we stop are our objective elements of being. Those of a dog are different from those of a Humboldt; those of a practical man from those of a metaphysician. But the dog's and the practical man's thoughts *feel* continuous, though to the Humboldt or the metaphysician they would appear full of gaps and defects. And they *are* continuous *as thoughts*. It is only *as mirrors of things* that the superior minds find them full of omissions. And when the omitted things are discovered and the unnoticed differences laid bare, it is not that the old *thoughts* split up, but that *new thoughts supersede* them, which make new judgments about the same objective world.

The Principle of Mediate Comparison

When we discriminate an element, we may contrast it with the case of its own absence, of its simply not being there, without reference to what *is* there, or we may also take the latter into account. Let the first sort of discrimination be called *existential*, the latter *differential* discrimination. A peculiarity of differential discriminations is that they result in a perception of differences which are felt as *greater or less* one than the other. Entire groups of differences may be ranged in series; the musical scale, the color scale, are examples. Every department of our experience may have its data written down in an evenly gradated order, from a lowest to a highest member. And any one datum may be a term in several such orders. A given note may have a high place in the pitch series, a low place in the loudness-series, and a medium place in the series of agreeablenesses. A given tint must, in order to be fully determined, have its place assigned in the series of qualities, in the series of purities (freedom from white), and in the series of intensities or brightnesses. It may be low in one of these respects, but high in another. In passing from term to term in any such series we are conscious not only of each step of difference being equal to (or greater or less than) the last, but we are conscious of proceeding in a *uniform direction* different from other possible directions. This *consciousness of serial increase of differences* is one of the fundamental facts of our intellectual life. More *more*, MORE, of the same kind of difference, we say, as we advance from term to term and realize that the farther on we get the larger grows the breach between the term we are at and the one from which we started. Between any

our own movements carrying our senses from one part of space to another or because new objects come successively and replace those by which we were at first impressed The simple impression of Hume the simple idea of Locke are both abstractions never realized in experience Experience from the very first presents us with concreted objects vaguely continuous with the rest of the world which envelops them in space and time and potentially divisible into inward elements and parts These objects we break asunder and [illegible] treat them in both ways fo [illegible]

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ject for that mind The law is that all things fuse that *can* fuse and nothing separates except what must What makes impressions separate we have to study in this chapter Although they separate easier if they come in through distinct nerves yet distinct nerves are not an unconditional ground of th[illegible] tion as we shall presentl[illegible]

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[illegible] upon our minds just as they are [illegible] only *unconsciously* or at least *inattentively* Our first unanalyzed sensation was really composed of these elementary sensations our first rapid conclusion was really based on these intermediate inferences all the while only we

[1] Montgomery in *M* *d* x p 527 Cf also Lipps *G undt ts h des S l nlebens* p 579 ff and see below Chapter XIX.

tempted to generalize and to say that all difference is but addition and subtraction and that what we called differential discrimination is only existential discrimination in disguise that is to say that where *A* and *B* differ we merely discern something in the one which the other is without. *Absolute identity in things up to a certain point then absolute non identity* would on this theory take the place of those ultimate qualitative unlikenesses between them in which we naturally believe and the mental function of discrimination ceasing to be regarded as an ultimate one, would resolve itself into mere logical affirmation and negation or perception that a feature found in one thing in another does not exist.

Theoretically however this theory *is full of difficulty* If all the differences which we feel were *in o e direct on* so that all objects could be arranged in one series (however long) it might still work. [illegible] fact that objects differ from each other *in* [illegible] nigh impossible to make it do so For the [illegible] from things in one direction by the incremen[illegible] things in another direct[illegible] sort of increment call it *d'* so that, after getting rid of qua[illegible] back on our hands agai[illegible] our method and say that the difference between *a* and [illegible] unlikeness but a fact of composition one of them bein the same as the other *plus* an increment of still higher order δ for example added But when we recollect that everythin in the world can be compared with everything else and that the number of directions of difference is indefinitely great then we see that the complication of self-compoundings of the ultimate differential increment by which on this theory all the innumerable unlikenesses of the world are explained in order to avoid writing any of them down as ultimate differences of kind would beggar all conception. It is the mind-du t theory with all its difficulties in a particularly uncompromisin form and all for the sake of the fantastic p easure of being able arb trarily to say that there is between the things in the world and between the ideas in the mind nothing but absolute sameness and absolute not sameness of elements the not sameness admitting no degrees.

To me t seems much wiser to turn away from such transcendental extravagances of speculation, and to abide by the natural appearances. These would leave unlikeness as an indecomposable relation amongst things, and a relation moreover of which there were all degrees. Absolute not sameness would be the maximal degree absolute sameness the minimal degree of this unlikeness the discernment of which would be one of our ultimate cognitive powers Certainly the natural appearances are dead against the notion that no qualitative

[illegible]tumpf *Tonpsychologie* I, p. [illegible]6 ff) tries to pr ve that the theory that all differences are differences f composition leads necessarily t an infinite regression when we try to determine the unit. It seems to me that in his particular reasoning he forgets the ultimate units of the mind-stuff theory I cannot find the completed infinite to be one of the bstacles to belief in this theory although I fully accept Stumpf's general reasoning and am only too happy to find myself on the same sid with such an exceptionally clear thinker Th strictures by Wahle in the *Vierteljsch. f wiss Phil.* seem to me to have no force, since the writer does not discriminate between resemblance of things bviously compound and that of things sensibly simple.

two terms of such a series the difference is greater than that between any intermediate terms or than that between an intermediate term and either of the extremes The louder than the loud is louder than the less loud the farther than the far is farther than the less far the earlier than the early is earlier than the late the higher than the high is higher than the low the bigger than the big is bigger than the small or to put it briefly and universally *the more than the more is more than the less* such is *the great synthetic principle of mediate comparison which is involved in the possession by the human mind of the sense of serial increase* In Chapter XXVIII we shall see the altogether overwhelming importance of this principle in the conduct of all our higher rational operations.

Are All Differences Difference of C

t... u uerence does consist simply in the fact that one object is the same ... n one another we can plainly see as the other *plus* something else or that they both have an identical part to which each adds a distinct remainder Thus two pictures may be struck from the same block but one of them may differ in having color added or two carpets may show an identical pattern which in each is woven in distinct hues. Similarly two classes of sensation may have the same emotional tone but negate each other in remaining respects—a dark color and a deep sound for example or two faces may have the same shape of nose but everything else unlike The similarity of the same note sounded by instruments of different t mb plained by the coexistence of f

u tper irradiations of the cold so to speak ... rtain additional feelings broader and which were not in the earlier experience though for aught I can tell the feelings may be otherwise the same Hefting first one weight and then another new feelings may start out in my elbow joint wrist and elsewhere and make me call the second weight the heavier of the twain In all these cases each of the differing things may be represented by two parts one that is common to it and the others and another that is peculiar to itself If they form a series *A B C D* etc and the common part be called X whilst the lowest difference be called d then the composition of the series would be as follows

$$A = X + d$$
$$B = (X + d) + d \quad \text{or } x + 2d$$
$$C = X + 3d$$
$$D = X + 4d$$
etc

If X itself were ultimately composed of d s we should have the entire series explained as due to the varying combination and re combination with itself of an unvarying element and all the apparent differences of quality would be translated into differences of quantity alone This is the sort of reduction which the atomic theory in physics and the mind stuff theory in psychology regard as their ideal So that following the analogy of our instances one might easily be

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matter of what sort the terms may be between which it obtains It is in short one of those transitive feelings or feelings of relation of which I treated in a former place (p 159 ff) and when once aroused its object lingers in the memory along with the substantive terms which precede and follow and enables our *judgments of comparison* to be made We shall soon see reason to believe that no two terms can possibly be s*multaneously* perceived to differ unless in a preliminary operation we have successively attended to each and in so doing had the transitional sensation of difference between them aroused A field of consciousness however complex is never analyzed unless some of its ingred ents have changed We *now* discern *tis true* a multitude of coexisting things about us at e ery moment but this is because we have had a long education and each thin we now see distinct has been already differentiated from ts ne ghbors by repeated appearances in successive order To the infant sounds s ghts touches and pains form probably one unanalyzed bloom of confusion [1]

Where the difference between the successive sensations is but slight the transition between them must be made as immediate as possible and both must be compared *in memory* in order to get the best results One cannot judge accurately of the difference between two similar wines whilst the second is still in one s mouth So of sounds warmths etc —we must get the dying phases of both

between the sensations the more uncertain is their discrimination

The diffe ence thus immed ately felt between two terms is independent of

the tw is the higher in pitch Similarly I may discriminate two ne ghboring tints whilst remaining uncertain which is the bluer or the yellower or *how* e the differs from its mate

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"W ften begin t b dimly w f diff rence in sensati gr p f sensati ns, bef w an assign any definit cha cter to th t which diff rs Thus w d t t trang f eign ingredient fla or in familia dish f t in f miliar tune, and y t ar

differences exist With the same clearness with which in certain objects we do feel a difference to be a mere matter of *plus* and *minus* in other objects we feel that this is not the case Contrast our feeling of the difference between the length of two lines with our feeling of the difference between blue and yellow, or with that between right and left Is right equal to left with somethin, added? Is blue yellow *plus* something? If so *plus* what?[1] So long as we stick to *tenfi able* psychology *we are forced to adm t I*

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anc ion of qualitative difference are in short, entirely disconnected mental functions[2]

But at the same time that we insist on this we must also admit that differences of quality however abundant are not the only distinctions with which our mind has to deal Differences which seem of mere composition, of number of *plus* and *minus* also abound[3] But it will be best for the present to disregard all these quantitative cases and tal ing the others (which by the least favorable calculation will still be numerous enough) to consider next *the manner in which we come to cogni e simple differences of kind* We cannot *explain* the cognition we can only ascertain the conditions by virtue of which it occurs

The Conditions of Discrimination

What then are the conditions under which we discriminate things differing in a simple way?

First *the things must* BE *different* either in time or place or quality If the difference in any of these regards is sufficiently great then we cannot overlook it except by not noticing the things at all No one can help singling out a black stripe on a white ground or feeling the contrast between a bass note and a high one sounded immediately after it Discrimination is here *involuntary* But where the objective difference is less discrimination need not so inevitably occur and may even require considerable effort of attention to be performed at all

Another condition which then favors it is that the sensations excited by *the differing objects should not come to us simultaneously but fall in immediate* SUCCESSION upon the same organ It is easier to compare successive than simultaneous sounds easier to compare two weights or two temperatures by testing

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[2] Her G H S hneid r n his youthful pamphlet (*Die Unte ch du g* 1877) has tried to show that there are no positively existent elements of sens bility no substant ve qualities between which differenc s obtain but that the terms we call such the s nsations are but sums of differences loci o st rt

ly which says that there are nothing but substantive sensations and d nies the existence of relations of diffe ences betw en them at all

[3] Cf Stumpf *Tonpsychologie* I p 121 and James Ward in *M d* I p 464

ly first *m* " then "*difference* " then *n*" but first *m* then *difference* then *n-different from-m* The several thoughts however to which these three several objects are revealed are three ordinary segments of the mental stream

As our brains and minds are actually made it is impossible to get certain *m* s and *n* s in immediate sequence and to keep them *pure* If kept pure it would mean that they remained uncompared. With us inevitably by a mechanism which we as yet fail to understand the shock of difference is felt between them and the second object is not *n* pure, but *n-as-different from-m* It is no more a paradox that under these conditions this cognition of *m* and *n* in mutual relation should occur than that under other conditions the cognition of *m* s or *n* s simple quality should occur But as it has been treated as a paradox and as a spiritual agent, not itself a portion of the stream has been invoked to account for it a word of further remark seems desirable

My account it will be noted is merely a description of the facts as they occur feelings (or thoughts) each knowing something but the later one knowing *if* preceded by a certain earlier one a more complicated object than it would have known had the earlier one not been there I offer no *explanation* of such a sequence of cognitions The explanation (I devoutly expect) will be found some day t depend on cerebral conditions. Until it is forthcoming we can only treat the sequence as a special case of the general law that every experience under gone b the brain lea es in t a modification which is one factor in determining what manner of experiences the following ones shall be (*cf* p 1,1) To any one who denies the possibility of such a law I have nothing to say until he brings his proofs.

The sensationalists and the spiritualists meanwhile (filled both of them with their notion that the mind must in some fashion *contain* what it knows) begin by gi in a crooked account of the facts Both admit that for *m* and *n* to be known in any way whatever little rounded and finished off duplicates of each must be contained in the mind as separate entities These pure *ideas* so called of *m* and *n* respectively succeed each other there And since they *are dist nct* sa the spiritualists distinguished *by what* forsooth? Truly the respective and ideas distinguished are synonymous expres ons different and distin

ill. Distinguished

Truly the respective

at very reason neither can distinguish itself from the other for to do that it would have to be aware of the other and thus for the time bein become the other and that would be to get mixed up with the other and to lose its own distinctness. Distinctness of ideas and dea of distinctness are not one thin but two This last is a *el tion.* Only a *elating principle* opposed in nature to all facts of feelin an Ego Soul or Subject is competent by being present to both of the ideas alike to hold them together and at the same time to keep them distinct.

B t if the plain facts be admitted that the *pure* idea of "*n* is *never in the*

In cases where the difference is slight, w ma eed, as previously remarked, t get th dying phase f as well as f *m* bef re *n-di erent from-m* is distinctl felt. In that case the inevitably successive feelings (as far as we can serve what is so ontinuous) would be *m di erence n, n-di erent from-m* This slight additional complicati alters t what th essential features of the case. *Analysis* J S Mill's ed., ii, p. 7 *Cf* also pp. 4.

With such direct perceptions of difference as this we must not confound those entirely unlike cases in which we *infer* that two things must differ because we know enough *about* each of them taken by itself to warrant our classing them under distinct heads It often happens when the interval is long between two experiences that our judgments are guided, not so much by a positive image or copy of the earlier one as by our recollection of certain facts about it Thus I know that the sunshine to day is less bright than on a certain day last week because I then said it was quite dazzling a remark I should not now care to make Or I know myself to feel b tt [illegible] ow than I was last summer because I [illegible] We are constantly busy comparin [illegible] of *acquaintance* at the [illegible] hard to conjure up in [illegible] eling The association [illegible] ate of an idea of pleasure being a pleasant idea of an idea of pain being a painful one but the unsophisticated sense of mankind is against them agreeing with Homer that the memory of griefs when past may be a joy and with Dante that there is no greater sorrow than in misery, to recollect one s happier time

Feelings remembered in this imperfect way *must* be compared with present or recent feelings by the aid of what we know about them We identify the remote experience in such a case by *conceiving it* The most perfect way of conceiving it is by defining it in terms of some standard scale If I know the thermometer to stand at zero to-day and to have stood at 32 last Sunday, I know to-day to be colder and I know just how much colder than it was last Sunday If I know that a certain note was *c* and that this note is *d* I know that this note must be the higher of the two

The inference that two things differ because their concomitants effects names kinds or—to put it generally—their *signs* differ is of course susceptible of unlimited complication The sciences furnish examples in the way in which men are led by noticing differences in effects to assume new hypothetical causes differing from any kno n b [illegible] ore But no matter how many may [illegible] minations are made *they all end in* [illegible] he *last* ground for inferring that A and B differ must be that whilst A is an *m* B is an *n* and that *m* and *n* are *seen to differ* Let us then neglect the complex cases the A s and the B s and go back to the study of the unanalyzable perception of difference between their signs the *m* s and the *n* s when these are seemingly simple terms

I said that in their immediate succession the shock of their difference was *felt* It is felt *repeatedly* when we go back and forth from *m* to *n* and we make a point of getting it thus repeatedly (by alternating our attention at least) whenever the shock is so slight as to be with difficulty perceived But in addition to being felt at the brief instant of transition the difference also feels as if incorporated and taken up into the second term which feels different from the first even while it lasts It is obvious that the second term of the mind in this case is not bald *n* but a very complex object and that the sequence is not sim

wholly unable for a wh le to say wh t the int uder is l ke H nce pe haps discrimination may be regarded as the arliest a d mo t prim d al mode of int llectual acti ity (Sully *Outlines of Psych logy* p 142 *Cf* also G H Schneider *D e Unte cheid g* pp 9–10)

ply first *m* then *difference* "then *n* but first *m* then *difference* then *n-dige cnt from-m* The several thoughts however to which these three several objects are revealed are three ordinary segments of the mental stream

As our brains and minds are actually made it is impossible to get certain *m* s and *n* s in immedia ... *A* keep them *pure* If kept pure it would mean that they re ... mechanism which we as yet fa... and the second ob... paradox that unde... should occur than ... quality should occur But as it has been trea... agent not itself a portion of the stream has been invoked to account for it a word of further remark seems desirable

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...

or Subject is competent by being present to both ... them together and at the same time to keep them distinct.

But if the plain facts be admitted that the *pure* idea of *n* is *never* *n the*

In cases where the difference is slight, w may need, as *previously remarked*, t g t the dving phase f as well as f *m* bef re *-di rent f om m* is distinctly felt. In that case the inevitably successive feelings (as far as w can seve what is so continuous) would be f u *m di erent n*, *-di erent from-m* This slight dditional complicati n alt rs t what the essential features of the case. Analysis J S Mill's ed., II, p. 7 *Cf* also pp. 14.

mind at all when *m* has once gone before and that the feeling *n different from m* is itself an absolutely unique pulse of thought the bottom of this preci ous quarrel drops out and neither party is left with anything to fight about Surely such a consummation ought to be welcomed especially when brou ht about as here by a formulation of the facts which offers itself so naturally and unsophistically [1]

We may then conclude our examination of the manner in which simple involuntary discrimination comes about by saying 1) that its vehicle is a thought possessed of a knowledge of both terms compared and of their difference 2) that the necessary and sufficient condition (as the human mind goes) for arousing this thought is that a thought or feeling of one of the terms discriminated should as immediately as possible precede that in which the other term is known and 3) and that the thought which knows the second term will then also know the difference (or in more difficult cases will be continuously succeeded by one which does know the difference) and both of the terms between which it holds

This last thought need however, not *be* these terms with their difference, nor *contain* them A man s thought can know and mean all sorts of things without those things getting bodily into it—the distant for example the future and the past [2] The vanishing term in the case which occupies us vanishes but be-

that is our inveterate tendency to believe that where two *must* be that e act duplicates of both have got into the s against each other there To which the f rst reply is the empirical one of Look into the mind and see When I recognize a weight which I now lift as *inferior* to the one I just lifted when with my tooth now aching I perceive the pain to be *less* intense than it was a minute ago the two things in the mind which are compared would by the authors I criticise be admitted to be an actual sensation and an image in the memory An image in the memory by general consent of these same authors is admitted to be a weaker thi g than a sensation Nevertheless it is in these instances judged stronger that is an object supposed to be known only in so far forth as this image represents it is judged stronger Ought not this to shake one s bel ef in the notion of separate representative ideas weighing themselves or be ng we ghed by the Ego against each other in the mind? And let it not be said that what makes us judge the felt pain to be weaker than the imag ed one of a moment s nce is our rec llection of the *do wnwa d natu e of the shock of diffe e ce* which we felt as we passed to the present moment from the o e l efore it That sho k does

us to establish a elation hich otherwise we should n t perce ve But one could hardly expect the memory of this shock to verpowe our actual compariso of terms both of which are *prese t* (as are the image and the sensation n th case supposed) and make us judge the we ker one to be the stronger — And hereupon c mes the second reply Suppose the mind does compare two realities by compari g t vo id as of its own which represent them—wh t is gained? The same mystery is st ll there The ideas must st ll be *know* and as the atten

a question of how to *name* the f cts least art f cially The egoi t *e plai s* them by naming them as an Ego combining or synth tizin two d as no more than we d by nam ng them a pulse of thought kn wi g two f cts.

[2] I fear th t few will be converted by my words, so obstinately do think rs of all schools refuse to admit the unmediated function of *knowing a thing* and so incorrigibly do they

cause it is the specific term
behind it when it vanishe
pulse of thou ht in a perf
comes next must know the vanished term and ...
there

Here w
successive y ...
any deeper into it for the present and turn to discriminations o ...
sort.

The Process of Analysis

And first of the discrimination of simultaneously felt impressions! Our first way of looking at a reality is often to suppose it simple but later we may learn to perceive it as compound This new way of knowing the same reality may conveniently be called by the name of *Analysis* It is manifestly one of the most incessantly performed of all our mental processes so let us examine the conditions under which it occurs.

I think we may safely lay down at the outset this fundamental principle that *a y total mp ess on made on the m nd must be unanalyzable whose ele ments a e never experie ced apart* The components of an absolutely changeless group of not-elsewhere-occurring attributes could never be discriminated If all cold things were wet and all wet things cold if all hard things pricked our skin and no other things did so is it likely that we should discriminate between coldness and wetness and hardness and pungency respectively? If all liquids were transparent and no non liqu d were transparent it would be long before we had separate names for liqu dity and transparency If heat were a function of position above the earth s surface so that the higher a thing was the hotter it became one word would serve for hot and hi h We have in fact a number of sensations whose concomitants are almost invariably the same and we find it accordin ly almost impossible to analyze them out from the totals in which they are found The contraction of the diaphragm and the expansion of the lungs the shortening of certain muscles and the rotation of certain joints are examples The converging of the eyeballs and the accommodation for near objects are for each distance of the object (in the common use of the eyes) inseparably linked and neither can (without a sort of artificial training which shall presently be mentio ed) be felt by itself We learn that the *causes* of such groups of feelings are multiple and therefore we frame theories about the composition of the feelings themsel es by fusion integration synthesis or what not But by direct introspection no analysis of them is ever made A consp cuous case will come to view when we treat of the emotions Every emo-

substi ut *bei g th the g f* t. E.g in th latest tterance f th spiritualisti philosophy (B ne's *Fal ductio t Psy hological Th ory* 887 published nly three days bef re this writing) one f th first se t nces which catch my ey is this What remembers? Th spiritualist says, th soul remembers t bides cross th years and th fl w f th body and *gathering p its past arrie t with it* (p 8) Why f hea en s sak O B wne, cannot y say *know it* ? If there is anything ur soul does *not* do t its past, t is to carry t with it.

tion has its expression of quick breathing palpitating heart flushed face or the like The expression gives rise to bodily feelings, and the emotion is thus necessarily and invariably accompanied by these bodily feelings The consequence is that it is impossible to apprehend it as a spiritual state by itself or to analyze it away from the lower feelings in question It is in fact impossible to prove that it exists as a distinct psychic fact The present writer strongly doubts that it does so exist But those who are most firmly persuaded of its existence must wait to prove their point until they [illegible] ie as yet unfound pathological [illegible] n a body or com

[illegible] utter unfelt

general then if an object [illegible]

[illegible] respectively by the aid of farther [illegible] These we now may turn to consider

If any single quality or constituent a of such an object have previously been known by us isolatedly or have in any other manner already become an object of separate acquaintance on our part so that we have an image of it distinct or vague in our mind disconnected with *bcd then that constituent a may be analyzed out from the total impression* Analysis of a thing means separate attention to each of its parts In Chapter XI we saw that [illegible] of attending to a thing was the [illegible] t

[illegible] separate imagination is the condition of analysis *Only such elements as we are acquainted with and can imagine separately can be discriminated within a total sense impression* The image seems to welcome its own mate from out of the compound and to heighten the feeling thereof whereas it dampens and opposes the feeling of the other constituents and thus the compound becomes broken for our consciousness into parts

All the facts cited in Chapter XI to prove that attention involves inward reproduction go to prove this point as well In looking for any object in a room for a book in a library for example we detect it the more readily if in addition to merely knowing its name etc we carry in our mind a distinct image of its appearance The [illegible] sauce is not obvi[illegible] old color an artist [illegible]

[illegible] green or violet is never experienced and so can never be discerned in the so-called primaries with which we have to deal the latter consequently pass for pure —The reader will remember how an overtone can only be attended to in the midst of its consorts in the voice of a musical instrument by sounding it previously alone The imagination being then full of it hears the like of it in the compound tone Helmholtz whose account of this observation we formerly quoted goes on to explain the difficulty

of the case in a way which beautifully corroborates the point I now seek to prove. He says:

"The natural simple elements of the sensation of tone, simple tones themselves, are rarely heard alone. Even those instruments by which they can be produced (as tuning-forks before resonance-chambers), when strongly excited, give rise to weak harmonic upper partials, partly within and partly without the ear. . . . Hence the opportunities are very scanty for impressing on our memory an exact and sure image of these simple elementary tones. But if the constituents are only indefinitely and vaguely known, the analysis of their sum into them must be correspondingly uncertain. If we do not know with certainty how much of the musical tone under consideration is to be attributed to its prime, we cannot but be uncertain as to what belongs to the partials. Consequently we must begin by making the individual elements which have to be distinguished individually audible, so as to obtain an entirely fresh recollection of the corresponding sensation, and the whole business requires undisturbed and concentrated attention. We are even without the ease that can be obtained by frequent repetitions of the experiment, such as we possess in the analysis of musical chords into their individual notes. In that case we hear the individual notes sufficiently often by themselves, whereas we rarely hear simple tones and may almost be said never to hear the building up of a compound from its simple tones."*

The Process of Abstraction

Very few elements of reality are experienced by us in absolute isolation. The most that usually happens to a constituent *a* of a compound phenomenon *abcd* is that its strength relatively to *bcd* varies from a maximum to a minimum; or that it appears linked with *other* qualities in other compounds, as *aefg* or *ahik*. Either of these vicissitudes in the mode of our experiencing *a* may, under favorable circumstances, lead us to feel the difference between it and its concomitants, and to single it out—not absolutely, it is true, but approximately—and so to analyze the compound of which it is a part. The act of singling out is then called *abstraction*, and the element disengaged is an *abstract*.

Consider the case of fluctuations of relative strength or intensity first. Let there be three grades of the compound, as *Abcd*, *abcd*, and *abcD*. In passing between these compounds the mind will feel shocks of difference. The differences, moreover, will serially increase, and their direction will be felt as of a distinct sort. The increase from *abcd* to *Abcd* is on the *a*-side, that to *abcD* is on the *d*-side. And these two differences of direction are differently felt. I do not say that this discernment of the *a*-direction from the *d*-direction will give us an actual intuition either of *a* or of *d* in the abstract. But it leads us to *conceive* or *postulate* each of these qualities, and to define it as the extreme of a certain direction. "Dry" wines and "sweet" wines, for example, differ and form a series. It happens that we have an experience of sweetness pure and simple in the taste of sugar, and thus we can analyze out of the wine-taste. But no one knows what "dryness" tastes like all by itself. It must, however, be something extreme in the dry direction, and we should probably not fail to recognize it as the original of our abstract conception, in case we ever did come across it. In some such way we get to form notions of the flavor of meats apart from their feeling to the tongue, or of that of fruits apart from their acidity, etc.; and we

* Sensations of Tone, 2d English ed., p. 65.

abstract the touch of bodies as distinct from their temperature We may even apprehend the quality of a muscle s contraction as distinguished from its extent or one muscle s contraction from another s as when by practising with prismatic glasses and varying our eyes convergence whilst our accommodation remains the same we learn the direction in which our feeling of the convergence differs from that of the accommodation

But the fluctuation ... ab
... may
... one thing and no ...
... come dissociated f ...

... analyze it out of a total whenever it ... again The law has been frequently recognized by psychologists, though I know of none who has given it the emphatic prominence in our mental history which it deserves Mr Spencer says

> If the property A occurs here along with the properties B C D there along with C F H and again with F ... by multiplication of experi... the organism will be discon... as the properties are in the ... ust eventually result a power to recognize attributes in themselves apart from particular bodies [1]

And still more to the point Dr Martineau in the passage I have already quoted writes

> When a red ivory ball ... awn it will leave a ... gave us will indis... before will an at... by force of contrast be shaken out into the foreground Let the white ball be replaced by an egg and this new difference will bring the *form* into notice from its previous slumber and thus that which began by being simply an object cut out from the surrounding scene becomes for us first a *red* object then a *red round* object and so on

Why the repetition of the character in combination with different wholes will cause it thus to break up its adhesion with any one of them and roll out as it were alone upon the table of consciousness ... suppo... th...

... that the mere fact that the com... term is repeated more often than any one of its associates will of itself give it such a degree of intensity that its abstraction must needs ensue

This has a plausible sound but breaks down when examined closely For it is not always the often repeated character which is first noticed when its concomitants have varied a certain number of times it is even more likely to be the most novel of all the concomitants which will arrest the attention If a boy has seen nothing all his life but sloops and schooners he will probably never distinctly have singled out in his notion of sail the character of being hung

[1] *Psychology* I p 345

to one that that will not be the form of ... *t ces* will be the new and exceptional character of being hung crosswise He will go home and speak of that and perhaps never consciously formulate what the more familiar peculiarity consists in

This mode of abstraction is realized on a very wide scale because the elements of the world in which we find ourselves appear as a matter of fact here there and everywhere and are changing their concomitants all the while But on the other hand the abstraction is so to speak never complete the analysis of a compound never perfect because no element is ever given to us absolutely alone and we can never therefore approach a compound with the image in our mind of any one of its components in a perfectly pure form Colors sounds smells are just as much entangled w... ments of experience such as extens... likeness harmony badness strength and ... embedded in one world But by the fluctuations and permutations of which we have poken we come to form a pretty good notion of the *direction* in which each element differs from the rest and so we frame the notion of it as a *terminus* and continue to mean it as an individual thing In the case of many elements the simple sensibles like heat cold the colors smells etc the extremes of the directions are almost touched and in these instances we have a compara t ely exact perception of what it is we mean to abstract But even this is only an approximation and in literal mathematical strictness *all* our abstracts must be confessed to be but imperfectly imaginable things At bottom the process is one of *concept on* and is everyw here even in the sphere of simple sensible qual ities *the same as that by which we are usually understood to attain to the no*tions of abstract goodness perfect felicity absolute power and the like the direct perception of a difference between compounds and the imaginary pro*lo gation of the direction of the difference* to an ideal terminus the notion of which we fix and keep as one of our permanent subjects of discourse

This is all that I can say usefully about abstraction or about analysis to which it leads

The Improvement of Discrimination by Practice

In all the cases cons dered h therto I have supposed the differences involved to be so large as to be flagrant and the discrimination where successive was treated as involuntary But so far from being always involuntary discrimina tions are often difficult in the extreme and by most men never performed Professor De Morgan thinking t is true rather of conceptual than of perceptive discrimination wrote wittily enough

> The great bulk of the ill gical part of the educated community—whether majority o mi ority I know not p haps six of e and half a do en of the other—have not po e to make a distinction, and f cou se cannot be mad t tak di tincti and f ourse ever ttempt to shake a di tinctio W th them all such things a e eva sions s bterfuges come-offs loop-holes etc. They w uld hang a man f r horse-

stealing under a statute against sheep-stealing and would laugh at you if you quibbled about the distinction between a horse and a sheep [1]

Any personal or practical interest however in the results to be obtained by distinguishing makes one s wits amazingly sharp to detect differences The culprit himself is not likely to overlook the difference between a horse and a sheep And long training and practice in distinguishing has the same effect as personal interest Both of these agencies give to small amounts of objective difference the same effectiveness upon the mind that under other circumstances only large ones would have Let us seek to penetrate the *modus operandi* of their influence—beginning with that of practice and habit

That practice makes perfect is notorious in the field of motor accomplishments But motor accomplishments depend in part on sensory discrimination Billiard playing rifle shooting tight rope dancing demand the most delicate appreciation of minute disparities of sensation as well as the power to make accurately graduated muscular response thereto In the purely sensorial field we have the well known virtuosity displayed by the professional buyers and testers of various kinds of goods One man will distinguish by taste between the upper and the lower half of a bottle of old Madeira Another will recognize by feeling the flour in a barrel whether the wheat was grown in Iowa or Tennessee The blind deaf mute Laura Bridgman had so improved her touch as to recognize after a year s interval the hand of a person who once had shaken hers and her sister in misfortune Julia Brace is said to have been employed in the Hartford Asylum to sort the linen of its multitudinous inmates, after it came from the wash by her wonderfully educated sense of smell

The fact is so familiar that few if any psychologists have even recognized it as needing explanation They have seemed to think that practice must, in the nature of things improve the delicacy of discernment and have let the matter rest At most they have said Attention accounts for it we attend more to habitual things and what we attend to we perceive more minutely This answer is true but too general it seems to me that we can be a little more precise

There are at least two distinct causes which we can see at work whenever experience improves discrimination

First the *terms* whose difference comes to be felt contract disparate associates and these help to drag them apart

Second the *difference* reminds us of larger differences of the same sort and these help us to notice it

Let us study the first cause first and begin by supposing two compounds of ten elements apiece Suppose no one element of either compound to differ from the corresponding element of the other compound enough to be distinguished from it if the two are compared alone and let the amount of this imperceptible difference be called equal to 1 The compounds will differ from each other however in ten different ways and altho gh e [illegible] t

t

[illegible] whose mouth nose eyes cheeks chin

[1] *A Budget of Paradoxes* p 380

and hair all differ slightly will be as little confounded by us as two appearances of the same man one with and the other without a false nose The only contrast in the cases is that we can easily name the *point* of difference in the one whilst in the other we cannot

Two things then B and C indistinguishable when compared together alone may each contract adhesions with different associates and the compounds thus formed may as wholes be judged very distinct. *The effect of practice in increasing discrimination must then in part be due to the reinforcing effect upon an original slight difference between the terms of additional differences between the diverse associates which they severally affect* Let B and C be the terms If A contract adhesions with B and C with D AB may appear very distinct from CD though B and C *per se* might have been almost identical

To illustrate, how does one learn to distinguish claret from burgundy? Probably they have been drunk on different occasions When we first drank claret we heard it called by that name we were eating such and such a dinner etc Next time we drink it a dim reminder of all those things chimes through us as we get the taste of the wine When we try burgundy our first impression is that it is a kind of claret but something falls short of full identification and presently we hear it called burgundy During the next few experiences the discrimination may still be uncertain— which we ask ourselves of the two wines is this present specimen? But at last the claret flavor recalls pretty distinctly its own name claret that wine I drank at So-and so s table etc and the burgundy flavor recalls the name burgundy and some one else s table *And only when this different* SETTING *has come to each is our discrimination between the two flavors solid and stable* After a while the tables and other parts of the setting besides the name grow so multifarious as not to come up distinctly into consciousness but *pari passu* with this the adhesion of each wine with its own *name* becomes more and more inveterate and at last each flavor suggests instantly and certainly its own name and nothing else The names differ far more than the flavors and help to stretch these latter farther apart. Some such process as this must go on in all our experience Beef and mutton strawberries and raspberries odor of rose and odor of violet contract different adhesions which reinforce the differences already felt in the terms

The reader may say that this has nothing to do with making us feel the *difference* between the two terms It is merely fixing identifying and so to speak substantializing the *terms* But what we feel as their *difference* we should feel even though we were unable to name or otherwise identify the terms

To which I reply that I believe that the difference is always concreted and made to seem *more substantial by recognizing* the terms I went out for instance the other day and found that the snow just fallen had a very odd look different from the common appearance of snow I presently called it a micaceous look and it seemed to me as if the moment I did so the difference grew

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this on our way of feeling a difference will be very generally admitted to follow from naming the terms between which it obtains although I admit myself that it is difficult to show coercively that naming or otherwise identifying any given

pair of hardly distinguishable terms is essential to their being felt as different at *first* [1]

I offer the explanation onl
Take the way in
example Two co ... nplete
say half an inch asunder ... ng the palm of the h nd ... m for
... kept
... at the
... n
... n

... y recognized when the points are simultaneously touched ... ween *a* and *f* to be so strong as to be that between *c* and *d* to be at first too small for this purpose If we began by putting the compasses on *a* and *f* and gradually contracted their openin the strong doubleness recognized at first would still be *suggested* as the com pass points approached the positions *c* and *d* for the point *e* would be so near *f* and so like it as not to be aroused without *f* also coming to mind Sim ilarly *d* would recall *e* and more remotely *f* In such wise *c—d* would no longer be bare *c—d* but something more like *abc—def*—palpably differing impressions But in actual experience the education can take place in a much less methodical way and we learn at last to discriminate *c* and *d* without any

[1] The explanation I offer presupposes that a difference too faint to have any d rect effect in the way of making the mind notice it *pe se* will nevertheless be strong enough to keep its terms from call ng up identical assoc ates It seems probable f om many observations that this is the case All the facts of unconscious inference are proofs of it We say a painting looks like the work of a certain artist though we cannot name the characteristic differentiæ We see by a man s face that h ... for our faith ... we can give no def nite reason ... nholtz a few pages below will ... w ll perhaps be easier und r ... Take two stereoscopic sl des ... ir of spots ... and *b* but make their distances such that ... whilst the *b* s are near r together on slide 1 than on ... 2 Make moreover the distance *ab*=*ab* and the distance *ab* =*ab* Then look suc

Slide 1

Slide 2



cessively at the two slides stereoscopically so that the *a* s n b th are d ectly fixated (that is fall on the two foveæ or centr s f distinctest v sion) The *a* s will then appear single and so probably w ll the *b* s But the n w singl seeming *b* on sl de 1 will look neare whilst that on sl de 2 will lo k fa th r than the *a* But if the diagrams are rightly d a vn *b* and *b* must affect d nt cal pots spots equally f r to the right of the fovea *b* in the left eye and *b* in the right eye The same is true of *b* and *b* Identical spots ar pots whose en ati ns cann t poss bly be discrimin t d as such Since in these two obs rva tions however they give rise to such oppo ite pe cepti ns of distance nd prompt such opposite tendencies to movement (since in slide 1 we *conv ge* in l oking from *a* to *b* wh lst in slide 2 we *d ve ge*) it follows that two processes whi h o cas n f l ... qu te indis tinguishable to d ect consciousne s may nevertheless be each allied w th disparate associ at s both of a sens rial and of a moto kind *Cf* Dond rs n *A ch v f Ophthalm logie* v L 13 (1867) The bas s of his essay is that we cannot *f el* on which eye a y pa ticul r element of a compound picture falls but its effects on our total p rception differ in the two eyes.

constant adhesion being contracted between one of these spots and *ab* and the other and *ef* Volkmann s experiments show this He and Fechner prompted by Czermak s observation that the skin of the blind was twice as discriminative as that of seeing folks sought by experiment to show the effects of practice upon themselves They discovered that even within the limits of a single sitting the *f* *lt double might* fall at the end to considerably

exercising one part of the skin in this way *impr*

only of the correspondin part of the opposite side of the body but of the neigh boring parts as well Thus at the beginning of an experimental sitting the compass points had to be a Paris line asunder in order to be distinguished by the little-finger tip But after exercisin the *other fingers* it was found that the little-finger tip could discriminate points only half a line apart.[1] The same relation existed betwixt divers points of the arm and hand

Here it is clear that the cause which I first suggested fails to apply and that we must invoke another

What are the exact experimental phenomena? The spots as such are not distinctly located and the difference as such between their feelings is not distinctly felt until the interval is greater than the minimum required for the mere perception of their *double ess* What we first feel is a bluntness then a sus p cion of doubleness which presently becomes a distinct doubleness and at last two different feeling and differently placed spots with a definite tract of space between them Some of the places we try give us this latest stage of the perception immediately some only give us the earliest and between them are intermediary places But as soon as the *image of the doubleness* as it is felt in the more discriminative places gets lodged in our memory it helps us to find its like in places where otherwise we might have missed it much as the recent hearing of an o ertone helps us to detect the latter in a compound sound (*supra* pp 285–86) A dim doubleness grows clearer by bein assimilated to the image of a distincter doubleness felt a moment before It is interpreted by means of the latter And so is any difference like any other sort of impression mo e easily perceived when we carry in our mind to meet it a distinct image of what sort of a thing we are to look for of what its nature is likely to be

These two processes the reinforcement of the terms by disparate associates and the filling of the memory with past differences of similar direction with the p esent one but of more consp cuous amount *are the only explanat ons I can offer of the effects of education n this l ne* What is accomplished by both processes is essentially the same thing they make small differences affect us as if they were large ones—that large differences should affect us as they do remains an inexplicable fact In principle these two processes ought to be suffi

[1] A.W V lkmann *Über den Einf us de Üb g* tc., Leipzig Berichte M th phys. Classe, x, 858 p. 67

Grundzüge, etc., pp 3 –33 also pp 8 49 5 6– 7

cient to account for all possible cases Whether in fact they are sufficient, whether there be no residual factor which we have failed to detect and analyze out I will not presume to decide

Practical Interests Limit Discrimination

It will be remembered that on page 332 personal interest was named as a sharpener of discrimination alongside of practice But personal interest probably acts through attention and not in any immediate or specific way A distinction in which we have a practical stake is one which we concentrate our minds upon and which we are on the look out for We draw it frequently, and we get all the benefits of so doing benefits which h
Where on the other h nd

ng it unnoticed and at last grow cal
presence Helmholtz was the first psychologist who dwelt on these facts as emphatically as they deserve and I can do no better than quote his very words

We are accustomed [he says] in a large number of cases where sensations of different kinds or in different parts of the body exist simultaneously to recognize that they are distinct as soon as they are perceived and to direct our attention at will to any one of them separately Thus at any moment we can be separately conscious of what we see of what we hear of what we feel and distin uish what we feel in a finger or in the great toe whether pressure gentl armth So also in the field of vision Ind lows we readily dis *knowledge* that they

nen we have becom
p teo and invariable ex

This it will be observed is only another statement of our law that the only individual components which we can pick out of compounds are those of which we have independent knowledge in a separate form

This induces us to think that nothing can be easier when a number of different sensations are simultaneously excited than to distinguish them individually from each other and that this is an innate faculty of our minds

Thus we find among oth o hear sepa and we ex

occur together we h

e conditions
on can or cannot be made as is the case in the physiology of the senses We then become aware that *grades must be distinguish d*

external things and processes
ning them This can take place without our needing or indeed being able to ascertain to what particular part of our sensations we owe this or that

In this case we will say that the impression of the d h her grade is when we

circumst
sensatio
immedi
the sen
ically The two cases must be car ully) Helmholtz means that it is

By the sensation be ng pe
not discriminated at all but
sations. That it *is* felt there ue of the total will chan e if an thing occurs to alter the *outer* c e
sation. The follow n pages from an earlier ed tion show what the concrete
cases of synthetic perception and what those of analytic perception are wont to
be

In th
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de d c nsc ous immedi tely and w
which has a bearing upon tho e pr tical p
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in training for this end excl s ely and fo
B t even within th phere f these ensatio
tr ining and pra ti e m ke them l es felt
quicker the painte in di criminating c lo s
is ot train d in the e m tte h w th m s cian and the mus cal instrument maker
p e with ea e and ertaint diff e ces of p tch and tone which fo the ear of
t r alms of cookery and wine
l

their ffect upon us a e th ref e I n
o ter wo ld. Th phy ol gy of the se se-organs has in ecent t mes made us ac
quai t d with numbe of s h phenomena disco er d p rtly con equence of
theo eti pecul t o s and q st onings, pa tly by indi iduals lik G the and Pu
ki with t le t f r this sort f ob rvati These so-
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d

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they may sometimes in dreaming and delirium form the starting poin
tions.

Let me gi e few well known cases taken from phys ological optics as examples.
E ery eye probably tains *muscæ ol tantes* so called these are fib es granules
tc. floating in the treous hum r th owin their shad ws on the tina and ppear

Sensations / *Ton* d English ed., p 6

Compare as to this, h w er what I said above, Ch pter pp 3 5

ing in the field of vision hey are most easily detected e like the sky Most persons are at

n the malady and this often makes the ery anxious about these harmless things and attentive to all their peculiarities It is then hard work to make them believe that th throughout all their n

degree shocked at finding that his as totally blind with a sort of blindness moreover which must have lasted years and yet he never was aware of it

Who besides would believe without performing the appropriate experiments that when one of his eyes is closed there is a great gap the so called blind spot not far from the middle of the field of the open eye in which he sees nothing at all but which he fills out with his imagination? Mariotte who was led by theoretic speculations to discover this phenomenon awakened no small surprise when he showed it at the court of Charles II of England The experiment was at that time repeated with many variations and became a fashionable amusement The gap is in fact so large that seven full moons alongside of each other would not cover its diameter and that a man s face 6 or 7 feet off disappears within it In our ordinary use of vision this great hole in the field fails utterly to be noticed becaus y wandering and the mom t

we never grow conscious of the blind ne field In order to notice it we must first purposely rivet our gaze upon one object and then move about a second object in the neighborhood of the blind spot striving meanwhile to *attend* to this latter without moving the direction of our gaze from the first object This runs counter to all our habits and is therefore a difficult thing to accomplish With some people it is even an impossibility But only when it is accomplished do we see the second object vanish and convince ourselves of the existence of this gap

Finally let me refer to the double images of ordinary binocular vision Whenever we look at a point with both eyes all objects on this side of it or beyond it appear double It takes but a moderate effort of observation to ascertain this fact and from this we may conclude that we have been seeing the far greater part of the external world double all our lives although numbers of persons are unaware of in the highest degree aston h d

n objects we alw e both n the habitual use of n such eldom a new not, to analyze our sensations Then only do we notice this phenomenon [1]

of po is a s c nd ry affect on superind ed by n y suppr s on of one of the sets of d uble mages in oth r wo ds by the positive and persistent refusal to use one f th eyes Th s e planati n f the bl ndness has however been called in quest on of late y ars See f r a b i f account of the matter

The same difficulty which is found in the observation of subjective sensations to which no external object corresponds is found also in the analysis of compound sensations which correspond to a single object Of this sort are many of our sensations of sound When the sound of a violin no matter how often we hear it excites over and over again in our ear the same sum of partial tones the result is that our feeling of this sum of tones ends by becoming for our mind a mere sign for the voice of the violin. Another combination of partial tones becomes the sensible sign of the voice of a clarinet etc. And the oftener any such combination is heard the more accustomed we grow to perceiving it as an integral total and the harder it becomes to analyze it by immediate observation. I believe that this is one of the principal reasons why the analysis of the notes of the human voice in singing is relatively so difficult. Such fusions of many sensations into what to conscious perception seems a simple whole bound in all our

Physiological optics affo

form f a near object come

which the eyes severally receive from it, and ... Before the position of each eye altering the perspective view of what is b fo e it. Before the invention of the stereoscope this explanation could only be assumed hypothetically but it can now be proved at any moment by the use of the instrument. Into the stereoscope we insert two flat drawings representing the two perspective views of the two eyes in such a manner that each eye sees its own view in the proper place and we obtain in consequence the perception of a single extended solid, as complete and vivid as if we had the re...

Now we can it is true

point recognize the diff

fo the stereoscop c p ...

t a dinarily slight as hardly to be recognized by the most careful comparison and it is certain that in our ordinary careless observing of bodily objects we never dream that the perception is due to two perspective views fused into one, because it a entirely different kind of perception from that of either flat perspective view

...

in s lation so we learn to separate the images on the two eyes by opening and closing them alternately

There are other much more complex instances of the way in which many sensations may combine to serve as the basis of a quite simple perception. When for example we perceive an object in a certain direction we must somehow be impressed by the fact that certain of our optic nerve fibres and no others are impressed by its light Furthermore we must rightly judge the position of our eyes in our head and of our head upon our body by means of feelings in our eye muscles and our neck muscles respectively If any of these processes is disturbed we get a false perception of the object's position. The nerve fibres can be changed by a prism before the eye or the eyeball's position changed by pressing the organ towards one side and such experiments show that for the simple seeing of the position of an object sensations of these two sorts must concur But it would be quite impossible to gather this directly from the sensible impression which the object makes Even when we have made experiments and convinced ourselves in every possible manner that such must be the fact, it still remains hidden from our immediate intuitive observation.

O F W ds th in B t M d d S g J rn cxvi, p 49 (Jan 887) and th e plies by Derby and th rs littl late

These examples [of synthetic perception perception in which each contributory sensation is felt *in* the whole and is a co determinant of what the whole shall be but does not attract the attention to its separate self] may suffice to show the vital part which the direction of attention and practice in observing play in sense-perception. To apply this now to the ear The ordinary task which our ear has to solve when many sounds assail it at once is to discern the voices of the several sounding bodies or instruments engaged beyond this it has no objective interest in analyzing We wish to know when many men are speaking together what each one says when many instruments and voices combine which melody is executed by each Any deeper analysis such as that of each separate note into its partial tones (although it might be performed by the same means and faculty of hearing as the first analysis) would tell us nothing new about the sources of sound actually present but might lead us astray as to their number For this reason we confine our attention in analyzing a mass of sound to the several instruments voices and expressly abstain as it were from discriminating the elementary components of the latter In this last sort of discrimination we are as unpractised as we are on the contrary well trained in the former kind[1]

[1] *Tonempfindungen* 3d ed pp 102–107 The reader who has assimilated the contents of our Chapter v above will doubtless have remarked that the illustrious physiologist has fallen in these paragraphs into that sort of interpretation of the facts which we there tried to prove erroneous Helmholtz however is no more careless than most psychologists in

must be there also only in a synthetic —which is indistinguishable from what the authors whom we formerly rev ewed called an unconscious —state I will not repeat arguments sufficiently detailed in the earlier chapter (see especially pp 112–15) but simply say that what he calls the fusion of many *sensations* into one is really the production of one sensation by the co operation of many *organic conditions* and that what perception fails to discriminate (when it is synthetic') is not *sens t o s* already existent but not singled out but new objective *facts* judged truer than the facts already synthet cally perceived—two views of the solid body many harmonic tones nstead of one view and one tone states of the eyeball muscles thitherto unknown and the like These new facts when first discovered

supposed to have been hidden in them all the while

The re der can himself apply this criticism to the following passages from Lotze and

ing in wh ch we are certainly not conscious of clearly disti guishi g the diffe ent impressions Still it does not follow that in such a case we have a p sitive perception of an actual unity of the contents of our ideas arising from their mixture our state of mind seems rather to consist in (1) the consciousness of our inab l ty to separate what really has remained diverse and (2) in the g neral feeling of the disturbance pr duced in the economy of our body by the simult neous a ault of the stimuli N t that the sensat ons melt into one another but simply that the act of distinguishi g them is absent and this again certai ly not so far that the fact of the difference remains entirely unp rc i ed but only so f r as to prevent us from determining the amou t of the differ nce, nd from apprehending other relations between the different imp essio s A y e who is annoyed at on nd the same time by glowing heat dazzling light deafening n ise and an ffensive smell will certainly

After all we have said no comment seems called for upon these interesting and important facts and reflections of Helmholtz

Reaction Time after Discrimination

[illegible] has been made a subject of experimen[illegible]

[illegible]

particular signal to be received was unknown in advance [illegible] time occupied by those reactions in which its character had first to be discerned over the simple reaction time measured according to Wundt the time required for the act of discrimination It was found longer when four different signals were irregularly used than when only two were used In the former case it averaged for three observers respectively (the signals being the sudden appearance of a black or of a white object)

0 050 sec
0 047
0 079

[illegible]

These examples [of synthetic perception perception in which each contributory sensation is felt *in* the whole and is a co determinant of what the whole shall be but does not attract the attention to its separate self] may suffice to show the vital part which the direction of attention and practice in observing play in sense-perception To apply this now to the ear The ordinary task which our ear has to solve when many sounds assail it at once is to discern the voices of the several sounding bodies or instruments engaged beyond this it has no objective interest in analyzing We wish to know when many men are speaking together what each one says when many instruments and voices combine which melody is executed by each Any deeper analysis such as that of each separate note into its partial tones (although it might be performed by the same means and faculty of hearing as the first analysis) would tell us nothing new about the sources of sound actually present but might lead us astray as to their number For this reason we confine our attention in analyzing a mass of sound to the several instruments voices and expressly abstain as it were from discriminating the elementary components of the latter In this last sort of discrimination we are as unpractised as we are on the contrary well trained in the former kind.[1]

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to prove erroneous Helmholtz however is no more careless than most psychologists in confounding together the object perceived the organic conditions of the perception and the sensations which *would* be excited by the several parts of the object or by the several or

must be there also only in a synthetic —which is indistinguishable from what the authors whom we formerly reviewed called an unconscious —state I will not repeat arguments sufficiently detailed in the earlier chapter (see especially pp 112–15) but simply say that what he calls the fusion of many *sensations* into one is really the production of one sensation by the co operation of many *organic conditio s* and that what perception fails to discriminate (when it is synthetic') is not *sensations* already existent but not singled out but new objective *facts* judged truer than the facts already synthetically perceived—two views of the sol d body many harmonic tones instead of one view and one tone states of the

supposed to have been hidden in them all the while

The reader can himself apply this criticism to the following passages from Lotze and

way of feeling them

Lotze says It is indub table that the simultaneous assault of a variety of different stimuli on d fferent senses or even on the same sense puts us into a stat of confused general feel ing n which we are certainly not conscious of clea ly distinguishing the diffe ent impressions Still it does not follow that in such a case we ha e a positive perception of an actual unity of the contents of our ideas arising from their mixture our state of mind seems rather to consist in (1) the consciousness of our inability to separate what really has remained diverse and (2) in the general feeling of the disturbance produced in the economy of our body by the simultaneous s ult of the st muli N t th t the sensations melt into one another but simply that the act of distinguishing them is bsent and this again certainly not so far that the fact of the d ffer ce remains entirely unperc i ed but only so f r as to prevent us from determi g the amount of the difference and from app ehending their relations between the different impressions Anyone who s an)ed t on nd the same time by glowing he t dazzling l ght deafen g noise and an offensive smell will certainly

After all we have said no comment seems called for upon these interesting and important facts and reflections of Helmholtz

Reaction Time after Discrimination

The *time required for discrimination* has been made a subject of experimental measurement Wundt calls it *Unterscheidungszeit* His subjects (whose simple reaction-time—see p 56 ff —had previously been determined) were required to make a mov ... t nt they discerned *which* of two or more s gnal ... the movement were ... particular s gnal to be received was unknown in ad ... time occupied by those reactions in which its character had first to be discerned over the simple reaction time measured according to Wundt the time required for the act of discrimination It was found longer when four different signals were irregularly used than when only two were used In the former case it avera ed for three observers respectively (the signals be ng the sudden appearance of a black or of a white object)

0 050 sec
0 047
0.079

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en tl It is ly in ... th t I ca m g th t
which is som times described as ...
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di ty existed ... t w uld h ... thing t guid t t th pl es wh ...
lish th m, to indicat th width t was t g th m (*M l physik* § 60, E gl h trans-

mnt taste, t ... tain th ... th bj cts f ts know as m ...
ldness, respecti ly ... gr und t pp th t th ... chi l f this last ry mpl x
perceptio has any identity with th earlier psych sis—l ast f all is tain d in t.

In the latter case a red and a green signal being added to the former ones it became for the same observers,

0 157
0 073
0 132 [1]

Later in Wundt s laboratory Herr Tischer made many careful experiments after the same method where the facts to be discriminated were the different degrees of loudness in the sound which served as a signal I subjoin Herr Tischer s table of results explaining that each vertical column after the first gives the average results obtained from a distinct individual and that the figure in the first column stands for the number of possible loudnesses that might be expected in the particular series of reactions made The times are expressed in thousandths of a second

2	6	8 5	10 75	10 7		
3	10	14.4	19 9	22 7	33	53
4	16 7	20 8	29	29 1	58 5	57.8
5	25 6	31			75	84
					95 5	138[2]

ations and the rapid
ie number of possible
u u scriminate The individual variations are largely due to want of practice in the particular task set but partly also to discrepancies in the psychic process One gentleman said for example that in the experiments with three sounds he kept the image of the middle one ready in his mind and compared what he heard as either louder lower or the same His discrimination among three possibilities became thus very similar to a discrimination between two[3]

Mr J M Cattell found he could get no results by this method [4] and reverted to one used by observers previous to Wundt and which Wundt had rejected This is the *einfache Wahlmethode* as Wundt calls it The reacter awaits the signal and reacts if it is of one sort but omits to act if it is of another sort The reaction thus occurs after discrimination the motor impulse cannot be sent to the hand until the subject knows that the signal is The nervous impulse as Mr Cattell says must probably travel to the cortex and excite changes there causing in consciousness the perception of the signal These changes occupy the time of discrimination (or perception time as it is called by Mr C) But *then* a nervous impulse must descend from the cortex to the lower motor centre which stands primed and ready to discharge and this as Mr C says gives a will time as well The total reaction time thus includes both will time and discrimination time But as the centrifugal and centripetal processes occupying these two times respectively are probably about the same and the time used in the cortex is about equally divided between the perception of the signal and the preparation of the motor discharge if we divide it equally between per

error cannot be great. We can more-

time.

Guided by these principles Prof. Cattell found the time required for distinguishing a white signal from no signal to be in two observers

0.030 sec. and 0.050 sec.

that for distinguishing one color from another was similarly

0.100 and 10 10

that for distinguishing a certain color from ten other colors

0 105 and 0.117

that for distinguishing the letter A in ordinary print from the letter Z

0.142 and 0.137

that for distinguishing a given letter from all the rest of the alphabet (not reacting until that letter appeared)

0.119 and 0.116

that for distinguishing a word from any of twenty-five other words from

0.118 sec. to 0.158 sec.

The difference depending on the length of the words and the familiarity of the language to which they belonged.

Prof. Cattell calls attention to the fact that the time for distinguishing a word is often but little more than that for distinguishing a letter.

> We do not therefore distinguish separately the letters of which a word is composed, but the word as a whole. The application of this in teaching children to read is evident.

He also finds a great difference in the time with which various letters are distinguished, E being particularly bad.

I have in describing these experiments followed the example of previous writers and spoken as if the process by which the nature of the signal determines the reaction were identical with the ordinary conscious process of discriminative perception and volition. I am convinced, however, that this is not the case, and that although the results are the same, the form of consciousness is quite different. The reader will remember my contention (*supra*, p. 59 ff.) that the simple reaction time (usually supposed to include a conscious process of perception) really measures nothing but a reflex act. Anyone who will perform reactions with discrimination will easily convince himself that the process here also is far more like a reflex than like a deliberate operation. I have made with myself and students a large number of measurements where the signal expected was in one series a touch *somewhere* on the skin of the back and head, and in another series a spark *somewhere* in the field of view. The hand had to move as quickly as possible towards the place of the touch or the spark. It did so infalli

Mind, xi, p. 3.

For other determinations of discrimination-time by this method, of Kries and Auerbach, in *Archiv f. Physiologie*, vol. 1, p. 297 ff. (these authors get much smaller figures); Friedrich, *Psychologische Studien*, p. 39. Chapter ix of Beccolai's book, *Le Leggi del tempo*, etc., gives a full account of the subject.

bly and sensibly instantly whilst both place and movement seemed to be *perceived* only a moment later in memory These experiments were undertaken for the express purpose of [illegible] t at the sight of the [illegible] or whether a mo- [illegible] e spark and the reac [illegible] that was manifest to introspection was that no perception or idea of *any* sort preceded the reaction It jumped of itself whenever the signal came and perception was retrospective We must suppose then that the state of eager expectancy of a certain definite range of possible discharges innervates a whole set of paths in advance so that when a particular sensation comes it is drafted into its appropriate motor outlet too quickly for the perceptive process to be aroused In the experiments I describe the conditions were most favorable for rapidity for the connection between the signals and their movements might almost be called innate It is instinctive to move the hand towards a thing seen or a skin spot touched But where the movement is *conventionally* attached to the signal there would be more chance for delay and the amount of practice would then determine the speed This is well shown in Tischer s results quoted on p 342 where the most practised observer Tischer himself reacted in one eighth of the time needed by one of the oth [illegible] all investigators have [illegible]

[illegible] the experimental conditions leads to a [illegible] lar result But it is the [illegible] e [illegible] say that the diameter of a circle is the same thing as its semi circumference because forsooth they terminate in the same two points [1]

The Perception of Likeness

The perception of likeness is practically very much bound up with that of difference That is to say the only differences we note *as* differences and estimate quantitatively and arrange along a scale are those comparatively limited differences which we find between members of a common genus The force of gravity and the color of this ink are things it never occurred to me to compare until now that I am casting about for examples of th [illegible]

[illegible] noth ng more [illegible] antics could [illegible] uoted The

St [illegible]
La [illegible] Th ir sho tened or muscu l r [illegible] mes g t when the expecta t attenti n was ddressed to the possible reactio s r ther than to the stimulus constitute th [illegible] time of which I speak, and all that I say in the text falls beautifully into line w th their results

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necessity—for any distinction may be called a difference
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are liable to be surprised by the difference If we start to ... different we are apt to discover how much they are alike *Difference commonly so called is thus between species of a genus* And the faculty by which we perceive the resemblance upon which the genus is based is just as ultimate and inexplicable a mental endowment as that by which we perceive the differences upon which the species depend There is a shock of likeness when we pass from one thing to another which in the first instance we merely discriminate numerically but at the moment of bringing our attention to bear perceive to be *similar* to the first just as there is a shock of difference when we pass between two dissimilars The objective extent of the likeness just like that of the difference determines the magnitude of the shock The likeness may be so evanescent or the basis of it so habitual and little liable to be attended to that it will escape observation alt ether Where however we find it there we make a genus of the things comp red and their discrepancies and incommensurabil ties in other respects can then figure as the *d ffere tiæ* of so many species As thinkables or existe
parabl
Muc
apply w th a simple change of language to resemblance as well We go through

into the r parts So that all that was said of the dependence of analysis upon a prel minary separate acquaintance with the character to be abstracted and upon its having varied concom tants finds a place in the psychology of resemblance as well as in that of difference

B t when all is said and done about the conditions which favor our perception of resemblance and our abstraction of its ground the crude fact remains that *some people are fa more sensitive to esembla ces and fa n ore ready to point out wherein they consist than others are* They are the wits the poets the inventors the scientific men the practical geniuses *A native talent for perceiving a alogies* is reckoned by Prof Bain and by others before and after him as *the leading fact in ge ius of e ery order* But as this chapter is already lon and as the question of genius had better wait till Chapter XXII where its practical consequences can be discussed at the same time I will say nothing more at present

Cf Sully in M d x, pp 494–95 B dl y b d xi p 83 B sa q t bid xi p 4 5

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has been do ese last few
permn find chapter is
ate founda
the others being Discrimination Retentiveness and Association

The Magnitude of D ces

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y such series The less like is the term th
starting point The d

y gradated series And it is an inter
in psychology that we are able in many departments of our sensibility to arrange the terms without difficulty in this evenly gradated way Differences in other words between diverse pairs of terms *a* and *b* for example on the one hand and *c* and *d* on the other [1] can be judged n
amount The distances f om r

of light or color whi h
ulty in arranging by t n

ow do we so r d [2]

if Stumpf says (*T npsycholog* 1 131 the int oducti n of the fourth t m brings nvoluntary cross comparisons with it *a* and *b* with *d* *b* with *c* etc which confuses us by w thdraw our attention from the relati ns we ought alone to be estimating

[2] J Delbœuf *Éléments de psychophy que* (P ris 1883) p 64 Plateau n Stumpf *Tonpsych* 1 p 125 I have noticed a curious enla gement of ce tain dist nces of d ffer ence under the influence of chl of the bells on the horses of a h rse of the vehicle ts lf which to our *was* continuous b dy f ou d ha e ng in oppos te dir ctions to get from tlds I m i clined to su pect from e ultimate ph l sophy of difference and 1 kene s w ll h ve to be built upon experiences of intoxicati n especially by n t us oxide gas which lets us into intuit ns the subtlety wher of is denied t the waki g tat *Cf* B I Blo d *The A a th tic R lation* and *The Gist of Philosophy* (Amsterdam N Y 1874) *Cf* also *M* d xii p 206

a difference at all? Prof Stumpf discusses this question in an interesting way[1] and comes to the conclusion that our feelin for the size of a difference and our

and

may often find it useful to do so as in musical intervals or figured lines But we need not do so and nothing more is really requ ed for a comparative judgment of the amount of a distance than three or four impressions belonging to a common kind

The vanishing of all perceptible difference between two numerically distinct things makes them *qual tat ely the same* or *equal* Equality or *qual tative* (as distinguished from numerical) *identity* is thus nothing but the *extreme degree of likeness*

We saw above (p 321) that some persons consider that the difference between two objects is constituted of two th ngs

y in respect of some attribute or attributes combined with the absolute non identity of the rest of the r bein This which may be true of compound thi gs b eaks down when we come to simple impress ons

When w mpar a d ep a middl and a high n te e g *C f* sharp a we rema k imm di t ly th t the first les like the third th n the eco d is The im w ld tru of *c d e* in th sam

o identical elements.

Op cit p 6 ff St mpf pp
[1] Stumpf pp 6– 1

an e
aliz

wh xist is the
b d f th equi lent se λ λβ Xγ g t inst ad f th
Th q estu imm di t ly aris H w is α β γ kn n as n ? A ding to th Wh t is gai d?

And as all compound resemblances are based on simple ones like these it follows that likeness *uberhaupt* must not be conceived as a special complication of identity but rather that identity must be conceived as a special degree of likeness according to the proposition expressed at the outset of the paragraph that precedes Likeness and difference are ultimate relations perceived As a matter of fact no two sensations no two objects of all those we know are in scientific rigor identical We call those of them identical whose difference is unperceived Over and above this we have a *conception* of absolute sameness, it is true but this like so many of our conceptions (*cf* p 331) is an ideal construction got by following a certain direction of serial increase to its maximum supposable extreme It plays an important part among other permanent meanings possessed by us in our ideal intellectual constructions But it plays no part whatever in explaining psychologically how we perceive likenesses between simple things.

The Measure of Discriminative Sensibility

In 1860 Professor G T Fechner of Leipzig a man of great learning and subtlety of mind published two volumes entitled *Psychophysik* devoted to establishing and explaining a law called by him the psychophysic law which he considered to express the deepest and most elementary relation between the mental and the physical worlds It is a formula for the connection between the amount of our sensations and the amount of their outward causes Its simplest expression is that when we pass from one sensation to a stronger one of the same kind the sensations increase proportionally to the logarithms of their exciting causes Fechner s book was the starting point of a new department of literature which it would be perhaps impossible to match for the qualities of thoroughness and subtlety but of which in the humble opinion of the present writer the proper psychological outcome is just *nothing* The psychophysic law controversy has prompted a good many series of observations on sense-discrimination and has made discussion of them very rigorous It has also cleared up our ideas about the best methods for getting average results when particular observations vary and beyond this it has done nothing but as it is a chapter in the history of our science some account of it is here due to the reader

Fechner s train of thought has been popularly expounded a great many times As I have nothing new to add, it is but just that I should quote an existing account I choose the one given by Wundt in his *Vorlesungen über Menschen und Thierseele* 1863 omitting a good deal

How much stronger or weaker one sensation is than another we are never able to say Whether the sun be a hundred or a thousand times brighter than the moon a cannon a hundred or a thousand times louder than a pistol is beyond our power to estimate The natural measure of sensation which we possess enables us to judge of the equality of the more and of the less but not of how many times more or less This natural measure is therefore as good as no measure at all whenever it becomes a question of accurately ascertaining intensities in the sensational sphere. Even though it may teach us in a general way that with the strength of the outward

theory these elements must themselves be made up of a part common to all and of parts differing in each which latter parts form a new series and so on *ad infinitum* which is absurd.

physical stimulus the strength of the concomitant sensation waxes or wanes till it leaves us witho t the slightest knowledge f whether the sensation aries in exactly the same proportion as the stimulus itself or at slower or a more rapid rate In a word, we know by our natural ensibili hi f the law that connects the sensation and its outward cause together d n exact measure for the sensation itself we m e begets a sensation f strength one strength two or three or four etc. But to do this we must first know tion two, three, or f ur times greater than another signifies.

Space magnitudes we soon learn to determine exactly because we only measure e spa e against another The measure f mental magnitudes is far more difficult.

But the problem of measuring the magnitude of sensat ons is the first step in the bold enterprise of making mental magnitudes altogether subject to exact measurement. Were ur whol knowledge limited to the fa t that the sensation rises when the stimulus rises, and falls when the latter falls much would n t be gained. But even immediate unaided bservation teaches us certain f cts which at least in a general way suggest the law according to which the sensati ns ary with their outward cause.

E ery one knows that in th stilly night we hear things unnoticed in the noise of da The gentle ticking of th clock the air circulating through the chimney the cra king f the chairs in the room, and a thousand other slight noises, impress them sel es upon our ear It is equally well known that in the confused hubbub of the st eets or the clamor f a railway we may lose not only what our neighbo says to us b t even not hear the sound of our own oice. The stars which are brightest at night are in isible by day and although we see the moon then, she is far paler than at night E eryon who has had t deal with weights knows that if to a pound in the hand a second pound be added, the difference is imm diately felt whilst if t be added to a hundredweight we are not aware f the difference at all.

Th sound of th clock, the light of the stars the pressure f th pound, these are all s muli t our senses, and stimuli whose outward amount remains the same. What then do these experiences teach E dently nothing but this that one and the same stimulus, according to the circumstances under which t operates, will be felt either m less intensely r not felt t all. Of what sort now is the al eration in the circumstances upo which this alterati in th feeling may depend? On considering th matt closely w see that t is ev rywhere of one and th same kind. The tick f the lock is feebl stimulus f r ur udit ry nerve which w hear plainly when it is alo but not when t is dded to the trong stimulus of the carriage-wheels and th r noises f th day Th light of th stars is a timulus to the eye. But if the stimu tion which this light exerts be dded t the trong stimulus of daylight we feel n thing f t alth ugh we feel it distinctly when t unites itself with the feebler stimulation of the twilight. The pound-weight is a stimulus to ur skin, which w feel when t j ins t elf to a preceding timulus of equal strength, but which anishes when t is combined with a timulus th usand times greate in am unt.

W may theref e lay t down as a general ru that stimulus m o der to be felt, m be so m ch the smaller if the alre dy p e-existing timulati n f the organ is small but must be so much the large the greater the pre-existing stimulation is. F om this m gen ral wa we can per ei the onn cti n between the stimulus and the feeling t excites At least thus much ppears that the law of dependence is not as simple e as might ha been expected beforehand. The simplest relati n would o m l be that th sensation should increase in identically the same rati as th

lus ought to provoke as great an increase of feeling as if it were added to a pre existing weak stimulus the light of the stars e g ought to make as great an addition to the daylight as it does to the darkness of the nocturnal sky This we know not to be the case the stars are invisible by day the addition they make to our sensation then is unnoticeable whereas the same addition to our feeling of the twilight is very considerable indeed So it is l he strength of the sensations does not increase in imuli but more slowly And now comes the ques stimulus grows greater To icrease of the sensation gro l suffice rease of the ir o not

su
onl
difi sensation might come from perience showed us what very unequal all these experiences expressed themselves in one kind of fact that the same difference of stimulus could in one case be felt and in another case if added to another pou d h

making the sensation seem to change *now much we can increase the stim* with stimuli of varying absolute amounts we shall be forced to choose in an equally varying way the amounts of addition to the stimulus which are capable of giving us a just barely perceptible feeling of *more* A light to be just perceptible in the twilight need not be near as bright as the starlight it must be far brighter to be just perceived during the day If n tions for all possible strengths iount of addition of the latter f sensation we shall have a alters when the stimulation is increased expressed the law according to which the

Observations according to this method are particularly easy to make in the spheres of light sound and pressure sensation Beginning with the latter case,

We find a surprisingly simple result The barely sensible addition to the original weight *must stand exactly in the same proportion to it* be the *same fraction* of it no matter what the absolute value may be of the weights on which the experiment is made As the average of a number of experiments this fraction is found to be about ⅓ that is no matter what pressure there may already be made upon the skin an increase or a diminution of the pre sure will be *felt* as soon as the added or subtracted weight amounts to one third of the weight originally there

Wundt then describes how differences may be observed in the muscular feelings in the feelings of heat in those of light and in those of sound and he concludes his seventh lecture (from which our extracts have been made) thus

So we have found that all the senses whose stimuli we are enabled to measure accurately obey a uniform law However various may be their several delicacies of discrimination *this* holds true of all that *the increase of the stimulus necessary to produce an increase of the sensation bears a constant ratio to the total stimulus* The figures which express this ratio in the several senses may be shown thus in tabular form

Sen ation of light	1/100
Muscular sensation	1/17
Feeling of p essure	
warmth	1/3
sound,	

These figu es a e far from gi ing as acc
lea t they a e fit t con ey a ge eral no
b lity of the diffe ent se ses The im
the elat n of the ens tion to the timu
the physiolog t Ernst Heinrich Weber to obtain in pecial cases Gustav Theod r Fe hner first pr ed t to be a law for all departments of sens tion Psych logy owes to him the first comprehensi e investigatio f sensations from a phys cal po nt of ew the first bas s of an exact The ry of Sensib lity

f wh t Fechner calls Weber s law The exact

given sensation contains will consist of the total number
which may be perceived in pa sing from no sensation of the kind to a sensation of the present amount We
that we know Weber s law
it is a function For if we kn
barely perceptible sensation and then what percentage of addition to the stim ulus will constantly g ve a barely perceptible increment to the sensation it is at bottom only a question of compound interest to compute out of the total amount of stimulus which we may be employing at any moment the number of h ments or in other words of sensational units to which it may give

and if be the percentage of itself which must be added to t to get a sensation which is barely percept ble—call this sensation 1—then we should have the series of sensation numbers corre ponding to their several stimuli as follows

Sensation o = stimulus A
$1 =$ $A(1+r)$
$2 =$ $A(1+r)$
$3 =$ $A(1+r)$

$n =$ $A(1+r)$

The sensations here form an arithmetical series and the stimuli a geometrical series and the two series correspond term for term Now of two series corre-

logar thmic tables so that we may truly say (assum ng our facts to be correct so

far) that the *sensations vary in the same proportion as the logarithms of their respective stimuli* And we can thereupon proceed to compute the number of units in any given sensation (considering the unit of sensation to be equal to the just perceptible increment above zero and the unit of stimulus to be equal to the increment of stimulus r which brings this about) by multiplying the lo a rithm of the stimulus by a constant factor which must vary with the particular kind of sensation in question If we call the stimulus R and the constant factor C we get the formula

$$S = C \log R$$

which is what Fechner calls the *psychophysischer Maasformel* This in brief is Fechner s reasoning as I understand it

The *Maasformel* admits of mathematical development in various directions and has given rise to arduous dis
from
not pi [illegible] u t say a word about them metaphysi cally a few pages later on Meanwhile it should be understood that no human being in any investigation into which sensations entered has ever used the numbers computed in this or any other way in order to test a theory or to reach a new result The whole not on of [illegible]

[illegible] e discussion of it however a great many particular facts have been discovered about discrimination which merit a place in this chapter

the [illegible]
do [illegible] tal fluctuations in our inner [illegible]
impossible to [illegible]

[illegible] e and those below the line then neutralize each other in the sum and the normal sensibility if there be one (that is the sensibility due to constant causes as distinguished from these accidental ones) stands revealed The best way of getting at the average sensibility has been very minutely worked out Fechner discussed three methods as follows

(1) *The Method of Just discernible Differences* Take a [illegible]
S and add to [illegible]

L [illegible] east discernible difference sought is $\frac{d + d}{2}$ and the ratio of this quantity to the original *S* (or rather to $S + d - d$) is what Fechner calls the difference-threshold *This difference threshold should be a constant fraction* (no matter what is the size of *S*) *if Weber's law holds universally true* The difficulty in applying this method is that we are *so often in doubt* whether anything has

[1] The most important am liorations of Fechner s formula are D lbœuf s in his *R ch ches sur la mesu e les sensations* (1873) p 35 and Elsas s in his pamphlet *Über d e Psych phys k* (1886) p 16

[2] Reversing the order is for the sake of letting the opposite accidental errors due to c n trast" neutralize each other

been added to *S* or not Furthermore if we simply take the smallest *d* about which we are *never* in doubt or in error we certainly get our least discernible difference larger than it ought theoretically to be

Of course the *sensibility* is small when the least discernible difference is large and *vice ersa* in other words it and the difference-threshold are inversely related to each other

(2) *The Method of True and False Cases* A sensation which is barely greater than another will on account of accidental errors in a long series of experiments sometimes be jud ed equal and sometimes smaller i.e we shall make a certain number of false and a certain number of true judgments about the difference between the two sensations which we are comparing

obt ed by c mp

stimuli *a* and *b* whi h when compa ed will give the same ratio of true to false cases

If this were done and the ratio of *a* to *b* then proved to be equal to that of *A* to *B* that would prove that pairs of small stimuli and pairs of large stimuli may affect our discriminative sens bility similarly so long as the ratio of the components to each other within each pair is the same *In other words it would in so* far forth prove the Weber an law Fechner made use of this method to ascertain his own power of discriminating differences of weight recording no less than 24 576 separate judgments and computing as a result that his discrimination for the same relative increase of wei ht was less good in the neighborhood of 500 than of 300 grams but that after 500 grams it improved up to 3000 which was the highest weight he experimented with

(3) *The Method of Average Errors* consists in takin a standard stimulus and then trying to make another one of the same sort exactly equal to it. There will in general be an error whose amount is large when the discriminative sensi bility called in play is small and *vice versa* The sum of the errors no matter whether they be positive or negative divided by their number gives the average error This when certain corrections are made is assumed by Fechner to be the reciprocal of the discriminative sensibil ty in question It should bear a c nstant proportion to the stimulus no matter what the absolute size of the latter may be if Weber s law hold true

These methods deal with just perceptible differences Delbœuf and Wundt have experimented w th larger differences by means of what Wundt calls the *Methode der mittle en Abstufungen* and what ve may call

(4) *The Method of Equal-appearing Intervals* This consists in so arranging three stimuli in a series that the intervals between the first and the second shall appear equal to that between the second and the third At first s ght there seems to be no direct logical connection between this method and the

Th reti lly t w uld eem th t t ght t b qual t th s m f all th dd ti which w j dg t be increases di ded by th t tal mbe f judgments mad

J Delbœ f *Element d p y h phy que* (883) p 9

If we look back over these facts as a whole we see that it is not any fixed amount added to an impression that makes us notice an increase in the latter but that the amount depends on how large the impression already is The amount is expressible as a certain fraction of the entire impression to which it is added and it is found that the fraction is a well nigh constant figure throughout an entire region of the scale of intensities of the impression in question Above and below this region the fraction increases in value This is *Weber's law* which in so far forth expresses an empirical generalization of practical importance without involving any theory whatever or seeking any absolute measure of the sensations themselves It is in the

Theoretic interpretation of Weber's Law

that Fechner s originality exclusively consists in his assumptions namely 1) that the just perceptible increment is the *sensation unit* and is in all parts of the scale the same (mathematically expressed $\Delta s =$ const) 2) that all our sensations consist of sums of these units and finally 3) that the reason why it takes a constant fractional increase of the [illegible]

[illegible] to find something inscrutably sublime in the existence of an ultimate psychophysic law of this form

These assumptions are all peculiarly fragile To begin with the *mental fact* which in the experiments corresponds to the increase of the stimulus is not an *enlarged sensation* but a *judgment that the sensation is enlarged* What Fechner calls the sensation is what appears to the mind as the *objective phenomenon* of light warmth weight sound impressed part of body etc Fechner tacitly if not openly assumes that such a *judgment of increase* consists in the simple fact that an *increased number* of sensation units are present to the mind and that the judgment is thus itself a quantitatively bigger mental th[illegible]
judges large differences
small ones But these ide
judgment which strains the attention most (if *that* be any criterion of the judgment s size) is that about the *smallest* things and differences But really it has no meaning to talk about one judgment being bigger than another And even if we leave out judgments and talk of sensations only we have already found ourselves (in Chapter VI) quite unable to read any clear meaning into the notion that they are masses of units combined To introspection our feeling of pink is surely not a portion of our feeling of scarlet nor does the light of an electric arc seem to contain that of a tallow candle in itself Compound *things* contain parts and one such thing may have twice or three times as many parts as another But when we take a simple sensible quality like light or sound and say that there is now twice or thrice as much of it present as there was a moment ago although we seem to mean the same thing as if we were talking of compound objects we really mean something different We mean that if we were to arrange the various possible degrees of the quality in a scale of serial increase the *distance interval* or *difference* between the stronger and the weaker specimen before us would seem about as great as that between the

weaker one and the be-inning of the scale *It is these* RELATIONS *these* DISTANCES *wh ch we are measuring and not the composition of the qualities them selves* as Fechner thinks Whilst if we turn to objects which *are* divisible surely a big object may be known in a little thought Introspection shows moreover that in most sensations a new *kind* of feelin invariably accompanies our judgment of an increased impression and this is a fact which Fechner s formula disregards.

But apart from these *a priori* difficulties and even supposing that sensations d d consist of added units Fechner s assumption that all *equally perceptible* additions are *equally great* additions is entirely arbitrary Why might not a small add tion to a small sensation be as *perceptible* as a large addition to a large one? In this case Weber s law would apply not to the additions themselves but only to their perceptibility Our *noticing* of a difference of units in two sensa tions would depend on the latter being in a fixed ratio But the *difference itself* would depend directly on that between their re pective stimuli So many units added to the stimulus so many added to the sensation and if the stimulus grew in a certain ratio in exactly the same ratio would the sensation also grow though its *percept bility* grew according to the logarithmic law [2]

If Δ stand for the smallest difference which *we percei e* then we should have nstead of the formula $\Delta s =$ const which is Fechner s the formula $\frac{\Delta s}{s}$ = const a formula which interprets all the *facts* of Weber s law in an entirely different theoretic way from that adopted by Fechner

The entire superstructure which Fechner rears upon the facts is thus not only seen to be arb trary and subjecti e but in the highest de-ree improbable as it! The whole outcome of the discuss on so far as Fechner s theories are concerned is indeed *nil* *Weber's l w alo e remains true as an empirical generali a tion of fair exte t* What we add to a large stimulus we notice less than what we add to a small one unless it happen *elati ely to the st mul s* to be as great

Cf Stumpf *T p y h l gie* pp 397–99 O se sati cann t b m ltipl f an the II t ld w ght t b bl t bt t th ne f m th oth d t f el th remaind by tself E ry sensati prese ts tself as indivisibl nit. Profess n Krie in the *Vie teljah schrift fur wiss Phil ph* vi p 57 ff sh w ery clearly th b dity f pposing that t g sens t ns tain weak es as pa ts Th y diff as q litati units C mp als J Tann ry in D lbœ f *Elém nt d p y hophy q* (883) p 34 ff J W d i *M d* 1, p 464 L tz *M t physik* § 58

F B tan *P y h l gi* pp 9 88 ff M k l thi ks th t his lt w th th m thod f eq al- ppearing interv ls sh w th t w mp re sid bl int rvals th each th by diff rent law f m that by which w tice ba ly pe ptibl int rv ls Th timuli f m ar thm tical es (p tty wild c ding t hi fi-ures) in th f rm cas geometrical in th l tt — t least so I d rstand this aliant experim t b t som hat bscur f cut writ

This is th f rm la wh ch M k l thinks h has erified (if I und tand him ght) by his experiments by m th d 4.

If we look back over these facts as a whole we see that it is not any fixed amount added to an impression that makes us notice an increase in the latter but that the amount depends on how large the impression already is The amount is expressible as a certain fraction of the entire impression to which it is added and it is found that the fraction is a well nigh constant figure throughout an entire region of the scale of intensities of the impression in question Above and below this region the fraction increases in value This is *Web er's law* which in so far forth expresses an empirical generalization of practical importance without involving any theory whatever or seeking any absolute measure of the sensations themselves It is in the

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These assumptions are all peculiarly fragile To begin with the *mental fact* which in the experiments corresponds to the increase of the stimulus is not an *enlarged sensation* but a *judgment that the sensation is enlarged* What Fech ner calls the sensation is what appears to the mind as the *objective phenome non* of light warmth weight sound impressed part of body etc Fechner tacitly if not openly assumes that such a *judgment of increase* consists in the simple fact that an *increased number* of sensation units are present to the mind and that the judgment is thi
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standin to wind up by sayin that nevertheless to him belongs the *imperishable glory* of first formulating them and thereby turning psychology into an *exact science*

> *"And everybody praised the duke*
> *Who this great fight did —*
> *But what good came of it at last?*
> *Quoth little Peterkin*
> *'Why that I cannot tell' said he*
> *But 'twas a famous victory!"*

Weber's law is probably purely physiological

One can express this state of things otherwise by saying that the whole of the stimulus does not seem to be effective in giving us the perception of more and the simplest interpretation of such a state of things would be *physical* The loss of effect would take place in the nervous system If our feelings resulted from a condition of the nerve molecules which it grew ever more difficult for the stimulus to increase our feelings would naturally grow at a slower rate than the stimulus itself An ever larger part of the latter s work would go to overcoming the resistances and an ever smaller part to the realization of the feeling bringing state Weber s law would thus be a sort of *law of friction* in the neural machine [1] Just how these inner resistances and frictions are to be con ceived is a speculative question Delbœuf has formulated them as fatigue Bern stein and Ward as irradiations The latest and probably the most real hypo thesis is that of Ebbinghaus who supposes that the intensity of sensation de pends on the *number* of neural molecules which are disintegrated in the unit of time There are only a certain number at any time which are *capable* of dis integrating and whilst most of these are in an average condition of instability some are almost stable and some already near to decomposition The smallest stimuli affect these latter molecules only and as they are but few the sensa tional effect from adding a given quantity of stimulus *at first* is relatively small Medium stimuli affect the majority of the molecules but affect fewer and fewer in proportion as they have already diminished their number The latest additions to the stimuli find [illegible]

ecules already disintegrated
e remainder thus giving rise
[illegible] small (*Pfluger's Archiv* pp

It is surely in some such way as this that Weber s law is to be interpreted if it ever is The Fechnerian *Maasformel* and the conception of it as an ultimate psychophysic law will remain an idol of the den if ever there was one Fechner himself indeed was a German *Gelehrter* of the ideal type at once simple and shrewd a mystic and an experimentalist homely and daring and as loyal to facts as to his theories But it would be terrible if even such a dear old man as this could saddle our Science forever with his patient whimsies and in a world so full of more nutritious objects of attention compel all future students to plough through the difficulties not only of his own works but of the still drier ones written in his refutation Those who desire this dreadful literature can find it it has a disciplinary value but I will not even enumerate it in a foot note The only amusing part of it is that Fechner s critics should always feel bound after smiting his theories hip and thigh and leaving not a stick of them

[1] Elsas *Übe d e Psychophys k* (1886) p 41 When the pans of a balance are al e dy loaded but in equ librium it takes a pr portionally larger weight add d to one of them to incline the beam

all *acts of reason* and that the mind proceeds from one object to another by some rational path of connection The trueness of this formula is only equalled by its sterility for psychological purposes. Practically it amounts to simply referring the inquirer to the relations between facts or things, and to telling him that his thinkin follows them.

But as a matter of fact, his thinking only sometimes follows them, and these so-called trans tions of reason are far from being all alike reasonable. If pure thought runs all our trains why should she run some so fast and some so slow some through dull flats and some through gorgeous scenery some to mountain heights and jewelled mines others through dismal swamps and darkness?—and run some off the track alto ether and into the wilderness of lunacy? Why do we spend years straining after a certain scientific or practical problem, but all in vain—thought refusing to evoke the solution we desire? And why some day walking in the street with our attention miles away from that quest, does the answer saunter into our minds as carelessly as if it had never been called for—suggested possibly by the flowers on the bonnet of the lady in front of us, or possibly by nothing that we can discover? If reason can give us relief then why did she not do so earlier?

The truth must be admitted that thought works under conditions imposed *ab extra* The great law of habit itself—that twenty experiences make us recall a thing better than one that long indulgence in error makes right thinking al most imposs[illegible] have no essential foundation in reason. The business of thought [illegible]
do with her [illegible]
after years wasted [illegible]
fantastic and arbitrary but nevertheless are part of the very bone and marrow of our minds. Reason is only one out of a thousand possibilities in the thinking of each of us Who can count all the silly fancies the grotesque suppositions [illegible]

[illegible]

less seems the same. The laws of our actual thinking of the *cogitatum* must ac co t alike for the bad and the good materials on which the arbiter has to decide for wisdom and for folly The laws of the arbiter of the *cogitandum* of what we o ght to think, are to the former as the laws of ethics are to those of history Who but an Hegelian historian ever pretended that reason in action was *per se* a sufficient explanation of the political changes in Europe?

There are then mechanical conditions on which thought depends and which to say the least *determine the order n which is presented the content or material for her comparisons selections and decisions* It is a suggestive fact that Locke and many more recent Continental psychologists have found themselves obliged to invoke a mechanical process to account for the *aberrations* of thought the obstructi e prepossess ons the frustrations of reason. This they found in the law of hab t, or what we now call Association by Contigu ty But it never occurred to these writers that a process which could go the length of

Chapter XIV

ASSOCIATION

AFTER discrimination association! Already in the last chapter I have had to invoke in order to explain the improv m by practice h re

o n

at first appearing as wholes are analyzed ... parts and objects appearing separately are brought together and appear as new compound wholes to the mind Analysis and synthesis are thus the incessantly alternating mental activities a stroke of the one preparing the way for a stroke of the other much as in walking a man s two legs are alternately brought into use both being indispensable for any or ...

The manner in wh h

... ue as the poles ... nd ... ons ... first sight startl ... l

... The prob ... themselves is that of ascertaining *principles of connection* between the thoughts which thus appear to sprout one out of the other whereby their peculiar succession or coexistence may be explained

But immediately an ambiguity arises which sort of connection is meant? connection *thought of* or connection *between thoughts?* These are two entirely different things and only in the case of one of ... is there any hope of finding pri... can never be form ... simply

large for

... y simplification which could possibly be aimed at would be the reduction of the relations to a smaller number of types like those which such authors as Kant and Renouvier call the categories of the understanding[1] According as we followed one category or another we should sweep with our thought through the world in this way or in that And all the categories would be logical would be relations of reason They would fuse the items into a continuum Were *this* the sort of connection sought between one moment of our thinking and another our chapter might end here For the only summary description of these infinite possibilities of transition is that they are

[1] Compare Renouvier s criticism of associationism in his *E ... de ... g ... ale Logique* II p 493 ff

sequence cohering in the same order in the memory.

In touch we have a smaller number of instances, though probably every one who bathes himself in a certain fixed manner is familiar with the fact that each part of his body over which the water is squeezed from the sponge awakens a premonitory tingling consciousness in that portion of skin which is habitually the next to be deluged. Tastes and smells form no very habitual series in our experience. But even if they did, it is doubtful whether habit would fix the order of their reproduction quite so well as it does that of other sensations. In vision, however, we have a sense in which the order of reproduced things is very nearly as much influenced by habit as is the order of remembered sounds. Rooms, landscapes, buildings, pictures, or persons with whose look we are very familiar surge up before the mind's eye with all the details of their appearance complete, so soon as we think of any one of their component parts. Some persons, in reciting printed matter by heart, will seem to see each successive word before they utter it, appear in its order on an imaginary page. A certain chess-player, one of those heroes who train themselves to play several games at once blindfold, is reported to say that in bed at night after a match the games are played all over again before his mental eye, each board being pictured as passing in turn through each of its successive stages. In this case, of course, the intense previous voluntary strain of the power of visual representation is what facilitated the fixed order of revival.

Association occurs as amply between impressions of different senses as between homogeneous sensations. Seen things and heard things cohere with each other, and with odors and tastes, in representation, in the same order in which they cohered as impressions of the outer world. Feelings of contact reproduce similarly the sights, sounds, and tastes with which experience has associated them. In fact, the "objects" of our perception, as trees, men, houses, microscopes, of which the real world seems composed, are nothing but clusters of qualities which through simultaneous stimulation have so coalesced that the moment one is excited actually it serves as a sign or cue for the idea of the others to arise. Let a person enter his room in the dark and grope among the objects there. The touch of the matches will instantaneously recall their appearance. If his hand comes in contact with an orange on the table, the golden yellow of the fruit, its savor and perfume will forthwith shoot through his mind. In passing the hand over the sideboard or in jogging the coal-scuttle with the foot, the large glossy dark shape of the one and the irregular blackness of the other awaken like a flash and constitute what we call the recognition of the objects. The voice of the violin faintly echoes through the mind as the hand is laid upon it in the dark, and the feeling of the garments or draperies which may hang about the room is not *understood* till the look correlative to the feeling has in each case been resuscitated. Smells notoriously have the power of recalling the other experiences in whose company they were wont to be felt, perhaps long years ago; and the voluminous emotional character assumed by the images which suddenly pour into the mind at such a time forms one of the stale topics of popular psychologic wonder—

Lost and gone and lost and gone!
A breath, a whisper,—some divine farewell,—
Desolate sweetness,—far and far away.

actually producing some ideas and sequences in the mind might safely be trusted to produce others too and that those habitual associations which further thought may also come from the same mechanical source as those which hinder it Hartley accordingly suggested habit as a sufficient explanation of all connections of our thoughts and in so doing planted himself squarely upon the *properly psychological aspect of the problem of connection and sought to treat* both rational and irrational connections from a single point of view The problem which he essayed however lamely to answer, was that of the connection between our psychic states considered purely as such regardless of the objective connections of which they might take cognizance How does a man come after thinking of A to think of B the next moment? or how does he come to think A and B always together? These were the phenomena which Hartley undertook to explain by cerebral physiology I believe that he was in many essential respects on the right track and I propose simply to revise his conclusions by the aid of distinctions which he did not make

But the whole historic doctrine of psychological association is tainted with one huge error—that of the construction of our thoughts out of the compounding of themselves together of immutable and incessantly recurring simple ideas It is the cohesion of these which the principles of association are considered to account for In Chapters VI and IX we saw abundant reasons for treating the doctrine of simple ideas or psychic atoms as mythological and in all that follows our problem will be to keep whatever truths the associationist doctrine has caught sight of without weighing it down with the untenable incumbrance that the association is between ideas

Association so far as the word stands for an *effect is between* THINGS THOUGHT OF—*it is* THINGS *not ideas which are associated in the mind* We ought to talk of the association of *objects* not of the association of *ideas* And so far as association stands for a *cause* it is between *processes in the brain*—it is these which by being associated in certain ways determine what successive objects shall be thought Let us proceed towards our final generalizations by surveying first a few familiar facts

The laws of motor habit in the lower centres of the nervous system are disputed by no one A series of movements repeated in a certain order tend to unroll themselves with peculiar ease in that order for ever afterward Number one awakens number two and that awakens number three and so on till the last is produced A habit of this kind once become inveterate may go on automatically And so it is with the objects with which our thinking is concerned With some persons each note of a melody heard but once will accurately revive in its proper sequence Small boys at school learn the inflections of many a Greek noun adjective or verb from the reiterated recitations of the upper classes falling on their ear as they sit at their desks All this happens with no voluntary effort on their part and with no thought of the spelling of the words The doggerel rhymes which children use in their games such as the formula

Ina mana mona mike
Barcelona bo ia strike

used for counting out form another familiar example of things heard in

registered, and the total time-interval between the two amounted in four observers to 1.009, 0.896, 1.037, and 1.154 seconds respectively. From this the simple physiological reaction-time and the time of merely identifying the word's sound (the "apperception time," as Wundt calls it) must be subtracted, to get the exact time required for the associated idea to arise. These times were separately determined and subtracted. The difference, called by Wundt the *association-time*, amounted in the same four persons to 706, 723, 752, and 874 thousandths of a second respectively. The length of the last figure is due to the fact that the person reacting (President G. S. Hall) was an American, whose associations with German words would naturally be slower than those of natives. The shortest association-time noted was when the word 'Sturm' suggested to Prof. Wundt the word 'Wind' in 0.341 second. Finally Mr. Cattell made some interesting observations upon the association-time between the look of letters and their names. "I pasted letters," he says, "on a revolving drum and determined at what rate they could be read aloud as they passed by a slit in a screen. He found it to vary according as one or more *than one letter* was visible at a time through the slit, and gives half a second as about the time which it takes to see and name a single letter seen alone.

When two or more letters are always in view, not only do the processes of seeing and naming overlap, but while the subject is seeing one letter he begins to see the ones next following, and so can read them more quickly. Of the nine persons experimented on, four could read the letters faster when five were in view at once, but were not helped by a sixth letter; three were not helped by a fifth, and two not by a fourth letter. This shows that while one idea is in the centre, two, three, or four additional ideas may be in the background of consciousness. The second letter in view shortens the time about [illegible], the third [illegible], the fourth [illegible], the fifth [illegible] sec.

I find it takes about twice as long to read (aloud, as fast as possible) words which have no connection as words which make sentences, and letters which have no connection as letters which make words. When the words make sentences and the letters words, not only do the processes of seeing and naming overlap, but by *one* mental effort the subject can recognize a whole group of words or letters, and by one will-act choose the motions to be made in naming, so that the rate at which the words and letters are read is really only limited by the maximum rapidity at which the speech-organs can be moved. As the result of a large number of experiments, the writer found that he had read words not making sentences at the rate of 1/4 sec., words making sentences (a passage from Swift) at the rate of 1/8 sec., per word. ... The rate at which a person reads a foreign language is proportional to his familiarity with the language. For example, when reading as fast as possible the writer's rate was, English 138, French 167, German 250, Italian 327, Latin 434, and Greek 484, the figures giving the thousandths of a second taken to read each word. Experiments made on others strikingly confirm these results. The subject does not know that he is reading the foreign language more slowly than his own; this explains why foreigners seem to talk so fast. This simple method of determining a person's familiarity with a language might be used in school examinations.

The time required to see and name colors and pictures of objects was determined in the same way. The time was found to be about the same (over 1/2 sec.) for colors as

[1] *Physiol. Psych.*, II, p. 280 ff.

[2] For interesting remarks on the sorts of things associated, in these experiments, with the prompting word, see Galton, *op. cit.* pp. 185 ff., and Trautscholdt in Wundt's *Philosophische Studien*, I, p. 213.

We cannot hear the din of a railroad train or the yell of its whistle without thinking of its long jointed appearance and its headlong speed nor catch a familiar voice in a crowd without recalling with the name of the speaker also his face But the most notorious and important case of the mental combination of auditory with optical impressions originally experienced together is furnished by language The child is offered a new and delicious fruit and is at the same time told that it is call [illegible] the window he exclaims [illegible] horse When learning [illegible] shape is before his eye [illegible] as he may live he will never see a fig a piebald horse or a letter of the alphabet without the name which he first heard in conjunction with each clinging to it in his mind and inversely he will never hear the name without the faint arousal of the image of the object [1]

The Rapidity of Association

Reading exemplifies this kind of cohesion even more beautifully It is an uninterrupted and protracted recall of sounds by sights which have always been coupled with them in the past I find that I can name six hundred letters in two minutes on a printed page Five distinct acts of association between sight and sound (not to speak of all the other processes concerned) must then have occurred in each second in my mind In reading entire words the speed is much more rapid Valentin relates in his *Physiology* that the reading of a single page of the proof containing 2629 letters took him 1 minute and 32 seconds In this experiment each letter was *understood* in $\frac{1}{28}$ of a second but owing to the integration of letters into entire words forming each a single aggregate impression directly associated with a single acoustic image we need not suppose as many as 28 separate associations in a sound The figures however suffice to show with what extreme rapidity an actual sensation recalls its customary associates Both in fact seem to our ordinary attention to come into the mind at once

The time measuring psychologists of recent days have tried their hand at this problem by more elaborate methods Galton using a very simple apparatus found that the sight of an unforeseen word would awaken an associated idea in about $\frac{5}{6}$ of a second [2] Wundt next made determinations in which the cue was given by single syllabled words called out by an assistant The person experimented on had to press a key as soon as the sound of the word awakened an associated idea Both word and reaction were chronographically

[1] Unless the name belong to a r pidly uttered sentence when no substantive image may have time to arise

[2] In his observations he says that time was l st in mentally taking in the word which was the cue owing to the quiet unobt usive w y in which I found it necessary to bring it into view so as not to distract the thoughts Moreover a substantive standing by itself is usually the equivalent of too abstract an idea for us to conceive properly without d lay Thus it is very difficult to get a quick concepti n of the word c rri ge because there are so many different kinds—two wh eled four wheeled open and clo d and in so ma y different poss ble positions, that the mind possibly hesitates amidst an obscure sense of many alternations that cannot blend together But limit the idea to say a landau and the mental association declares itself mo e quickly (*I quirie* etc p 190)

longer to call it to mind B knows quite as well as C that Dante was a poet but needs 1/10 of a seco d l nger to think of t. Such experiments lay bare the mental life in a way that is tartling and not always g atifying [1]

The Law of Contiguity

Time-determ h f t we have run over can all be summed up in the simp *come associate of the others a coex ste ce as before* This statement we may name the law of *menta ass u tio by contiguity*

I preserve this name in order to depart as little as possible from tradition d m of the process as that of association by *con*

law since it *way of acco nervous system* be truly a law of those nerve-centres which co-ordinate sensory and motor processes together that paths once used for couplin any pair of them are thereby made more permeable there appears no reason why the same law should not hold good of ideational centres and their couplin paths as well [5] Parts of

M nd xii pp 67 74.

C mpar Bain law f Association f Contiguity A ti ns Sensati s, d States f F ling occurring t th in close s ccessi tend t gr w t g th h e in ch w that h) f th m is ft rw d p e ent d t th mi d th th pt t be b ght p in d (*The S ns d th I t llc t p 3 7*) C mpare ls *Ha tl y* f rm lati Any sensati ns A B C, te by being associated w th an th sufficient Number f Times, g t ch power th rr p ding Ideas, *b c* tc. th t any f th ensati ns A wh imp essed al shall b bl t excite th Mind *b* tc. th d as f th rest (*Ob erv t ns M* part I, ch p I, § P p x.) Th t t ment in th text diff rs f m these in h lding f t t th bjectı p int f w It is *th gs* and bjects *p pertie thi g* which ar associat d in th ght

En y l p dıa B t ıca 9th ed ticl Psych l gy p 6 c l.

Phy l P y h d d., II, p 300

Th difficulty h as w th h b t *b h pt* in seein h w w p th m *fi t t* be f m d (*f* bo e p. 7) Experience sh ws that w path is f rm d between tres f r sensibl imp essi hen th se brat t ther in pid essi A child sees rtain bottl d hears t call d milk, and then f d thinks th am wh h gain sees th b ttl B t why th cssi simulta us excitement f tw t es ind pend l tim lated f m w th t by ght d th ther by h aring *h ld* ult in path bet en th m, ne does t imm diat ly se W can nly mak hyp theses A y h pothesis f th pecifi m d f their f mati which talli w ll w th th bser d f ts f associati ll be in so far f th credi l in p t f possibl bsc ty H Munst be g thinks (*B it g p P y h l gie* p 3) th t b tw en t es exist d c essı ly f m with t path ght t be f rmed d that conseq tly ll tigu us associati is bet ee *mult* us experi ce M W d (*l cit*) thinks th n that it can nly be bet ee cces ıt experiences Th associati f bjects sim l-taneously presented can be sol ed int an associ ti f bj cts cessi ely tt d d t I seems ha dly possibl t m ti case in which tt ti t th associ ted bjects co ld t have been successi e. In fact, an ggregat f bjects n which ttenti ld

for pictures and about twice as long as for words and letters Other experiments I have made show that we can recognize a single color or picture in a slightly shorter time than a word or letter but take longer to name it This is because in the case of words and letters the association between the idea and name has taken place so often that the process has become automatic whereas in the case of colors and pictures we must by a voluntary effort choose the name [1]

In later experiments Mr C

ons to
e lan
ongue

or his works etc The mean variation from the average is very great in all these experiments and the interesting feature which they show is the existence of certain constant differences between associations of different sorts Thus

From *country*	to *city*	Mr C s time was 0 340 sec.
" *season*	" *month*	" 0 399
" *language*	" *author*	" 0 523 "
" *author*	" *work*	0 596 "

The average time of two observers experimenting on eight different types of association was 0 420 and 0.436 sec respectively The very wide range of variation is undoubtedly a consequence of the fact that the words used as cues and the different types of association studied differ much in their degree of familiarity

For example B is a teacher of mathematics C has busied himself more with literature C knows quite as well as B that 7 + 5 = 12 yet he needs $\frac{1}{10}$ of a second

[1] *Mind* xi pp 64–65

[2] This value is much smaller than that got by Wundt as above No reason for the difference is suggested by Mr Cattell Wundt calls attention to the fact that the figures found by him give an average 0 720 exactly equal to the *t me int rval* which in his experiments (*v de nfra* chapter on Time) was reproduced without error either way and to that required according to the Webers for the legs to swing in rapid locomotion It is not improbable he adds that this psychic constant of the mean association time and of the most correct appreciation of

developed under the influence
ined the manner in which we
ys I Psych ii p 286) The
or psychologists to make pro-
ually all these averages deri ed
e ent rely out of line The only measurements of association time re Mr Cattell s figure thro s which so far seem likely to have much theo etic importance a e a f w made on insane patients by von Tschisch (Mendel s *Neu ologisches C nt alblatt* M y 15 1885 p 217) The simple reaction time was found about normal in three patients one with progressive paralysis one w th invet rate mania of per ecution one r covering from ordinary mania In the con alesc nt maniac and the paralytic however the associ tion time was hardly half as much as Wundt s normal figu e (0 28 and 0 23 inst ad of 0 7 —smaller also than Catt ll s) wh lst in the sufferer from delusions of persecuti n and halluci ati ns t was twice as g eat as norm l (1.39 in tead f 0 7) This latter patient s time was sixf ld that of the paralytic Herr von Tschisch remarks on the connection of the short times with diminished power for clea and consistent p ocess s of thought nd n that of the long times w th the persistent fixation of the attention upon monotonous obj cts (d lus ons) M ne Walitzky (*Revue philosoph que* xxviii p 583) has car ied von Tschisch s observations still farther making 18,000 measurem nts in all She found associat on time increased in paralytic dementia and diminished in mania. Choice time on the contrary is inc eased in mania

Hartley was more thorough in his grasp of the principle. The sensorial nerve-currents, produced when objects are fully present, were for him "vibrations," and those which produce ideas of objects in their absence were "miniature vibrations." And he sums up the cause of mental association in a single formula by saying:

"Any vibrations, A, B, C, etc., by being associated together a sufficient Number of Times, get such a Power over *a*, *b*, *c*, etc., the corresponding Miniature Vibrations, that any of the Vibrations A, when impressed alone, shall be able to excite *b*, *c*, etc., the Miniatures of the rest."

It is evident that if there be any law of neural habit similar to this, the continuities, coexistences, and successions met with in outer experience must inevitably be copied more or less perfectly in our thought. If A B C D E be a sequence of outer impressions (they may be events or they may be successively experienced properties of an object) which once gave rise to the successive ideas, *a b c d e*, then no sooner will A impress us again and awaken the *a* than *b c d e* will arise as ideas even before B C D E have come in as impressions. In other words, the order of impressions will the next time be *anticipated*, and the mental order will so far forth copy the order of the outer world. Any object when met again will make us expect its former concomitants, through the overflowing of its brain-tract into the paths which lead to them. And all these suggestions will be effects of a material law.

Where the associations are, as here, of successively appearing things, the distinction I made at the outset of the chapter between a connection *thought of* and a connection *of thoughts* is unimportant. For the connection thought of is concomitance or succession, and the connection between the thoughts is just the same. The objects and the ideas fit into parallel schemes, and may be described in identical language, as contiguous things tending to be thought again together, or contiguous ideas tending to recur together.

Now were these cases fair samples of all association, the distinction I drew might well be termed a *Spitzfindigkeit* or piece of pedantic hair-splitting, and be dropped. But as a matter of fact we cannot treat the subject so simply. The same outer object may suggest *either of many* realities formerly associated with

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only uses the principle to account for unreasonable and obstructive mental association. "'Twould have been easy to have made an imaginary dissection of the brain, and have shewn, why, upon our conception of any idea, the animal spirits run into all the contiguous traces, and rouse up the other ideas that are related to it. But though I have neglected any advantage which I might have drawn from this topic in explaining the relations of ideas, I am afraid I must here have recourse to it, in order to account for the mistakes that arise from these relations. I shall therefore observe, that as the mind is endowed with a power of exciting any idea it pleases; whenever it dispatches the spirits into that region of the brain in which the idea is placed, these spirits always excite the idea, when they run precisely into the proper traces, and rummage that cell which belongs to the idea. But as their motion is seldom direct, and naturally turns a little to the one side or the other; for this reason the animal spirits, falling into the contiguous traces, present other related ideas in lieu of that which the mind desired at first to survey. This change we are not always sensible of; but continuing still the same train of thought, make use of the related idea which is presented to us, and employ it in our reasoning, as if it were the same with what we demanded. This is the cause of many mistakes and sophisms in philosophy; as will naturally be imagined, and as it would be easy to show, if there was occasion."

Op. cit., prop. xi.

these centres which have once he n

ts excited afresh are numerous If a points were originally excited together the irradiation may be sensibly si multaneous throughout the system when any single point or group of points is touched off But where the original impressions were suc jugation of a Greek verb for order they will now wh n on

We must therefore suppose that in these ideational tracts as well as elsewhere activity may be awakened in any particular locality by the summation therein of a number of tensions each incapable alone of provoking an actual discharge Suppose for example the locality M to be in functional continuity with four other localities K, L N and O Suppose moreover that on four previous occasions it has been separately combined with each of these localities in a common activity M may then be in directly awakened by any cause which tends to awaken either K L N or O But if the cause which awal ens K for instance be so slight as only to increase its tension without arousing it to full discharge K will only succeed in slightly increasing the tension of M But if at the same time the tensions of L, N and O are similarly increased the combined effects of all four upon M may be so great as to awaken an actual discharge in this latter locality In like manner if the paths between M and the four other localities have been so slightly excavated by previous experience as to require a very intense excitement in either of the localities before M can be awakened a less strong excitement than this in any one will fail to reach M But if all four at once are mildly excited their compound effect on M may be adequate to its full arousal

The psychological law of association of objects thought of through their previous contiguity in thought or experience *would thus be an effect within the mind of the physical fact that nerve currents propagate themselves easiest through those tracts of conduction which have been already most in use* Descartes and Locke hit upon this explanation which modern science has not yet succeeded in improving

> Custom [says Locke] settles habits of thinking in the understanding as well as of determining in the will and of motions in the body all which seem *to be but trains of motion in the animal spirits* [by this Locke meant identically what we understand by *neural processes*] which once set agoing continue in the same steps they have been used to which by often treading are worn into a smooth path and the motion in it becomes easy and as it were natural [1]

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be focussed at once would be already associated B tween these extreme possibil ties I have refrained from deciding in the text and have described cont guous association as hold ing between both uccessively and c existently presented objects The phys l gic l question as to how we may concei e the paths to or gi ate had bett r be postp n d till it comes to us again in the ch pter on the Will whe e w can treat it in a b oader w y It is eno gh here to have called attent on t it as a erious p oblem

[1] *Essay c Human Unde standing* bk II chap XXXIII, § 6 Compa e Hume who like Locke

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Op cit p xi

it—for in the vicissitudes of our outer experience we are constantly liable to meet the same thing in the midst of differing companions—and a philosophy of association that should merely say that it will suggest one of these or even that one of them which it has oftenest accompanied would go but a very short way into the *rationale* of ... as far as ... Granted an ... hich of its associates it *will* suggest ... *has* suggested a second object that ... was once an associate They have had to supplement their principle of Contiguity by other principles such as those of Similarity and Contrast before they could begin to do justice to the richness of the facts

The Elementary Law of Association

I shall try to show in th ... ere is no ... All the ... vay in which one elementary process of ... whatever other elementary process it may have excited at some former time The number of elementary processes at work however and the nature of those which at any time are fully eff ... rousing the others determine ...

... of another we call it a product of association by contiguity or of association by similarity or contrast or whatever other sorts we may have recognized as ultimate Its production however is in each one of these cases to be explained by a merely quantitative variation in the elementary brain processes momentarily at work under the law of habit so that *psychic* contiguity similarity etc are derivatives of a single profounder kind of fact

My thesis stated thus briefly will soon become more clear and at the same time certain disturbing factors which co-operate with the law of neural habit, will come to view

Let us then assume as the *basis* of all our subsequent reasoning this law *When two elementary brain processes have been active together or in immediate succession one of them on reoccurring tends to propagate its excitement into the other*

But as a matter of fact every elementary process has found itself at different times excited in conjunction with *many* other processes and this by unavoidable outward causes Which of these others it shall awaken now becomes a problem Shall *b* or *c* be aroused next by the present *a*? We must make a further postulate based however on the fact of *tension* in nerve tissue and on the fact of summation of excitements each incomplete or latent in itself into an open resultant[1] The process *b* rather than *c* will awake if in addition to the vibrating tract *a* some other tract *d* is in a state of sub excitement and formerly was excited with *b* alone and not with *a* In short we may say

The amount of activity at any given point in the brain cortex is the sum of the tendencies of all other points to discharge into it such tendencies being

[1] See Chapter III pp 53 56

proportionate (1) to the number of times the excitement of each other point may have accompanied that of the point in question (2) to the intensity of such excitements ... *point functionally dis connected with the*

Expres in the ...
greatest ultimate simplification Let us for the present, ... ous trains of thought and ideation such as occur in revery or musing The case of voluntary thinking toward a certain end shall come up later

Take to fix our ideas the two verses from *Locksley Hall*

I the heir of all the ages *n the f remost fil s of t me*

and—

For I do bt ot th o gh the ages *one ncr asi g purpose runs*

Why is it that when we recite from memory one of these lines and get as far as *the ages* that portion of the other line which follows and so to speak sprouts out of *the ages* does not also sprout out of our memory and confuse the sense o ... follows *the ages* has its brain proc

less strong than that of *ages*) each of them indifferently ...
a large number of other words with which they have been at different times combined But when the processes of *I the heir of all the ages* simultaneously vibrate in the brain the last one of them in a maximal the others in a fading phase of excitement then the strongest line of discharge will be that which they al ... *I* nd not *o e* or any other word will be the next to a
only with th
d in away
on p 67 a fin e

But if some one of these preceding words— heir for example—had an intensely strong association with some brain tracts entirely disjoined in experi ... *H ll*—if the reciter for instance were tremu

would be such that its *own special associations would spread* over the combined ones of the other words He would as we say be abruptly reminded of his personal situation and the poem would lapse altogether from his thoughts

The writer of these pages has every year to learn the names of a large number of students who sit in alphabetical order in a lecture-room. He finally learns to call them by name as they sit in their accustomed places On meeting one in the street however early in the year the face hardly ever recalls the name but it may recall the place of its owner in the lecture-room his neighbors faces and consequently his general alphabetical position and then usually as the common associate of all these combined data the student s name surges up in his mind

A father wishes to show to some guests the progress of his rather dull child in kindergarten instruction Holding the knife upright on the table he says What do you call that my boy? I calls it a *knife* I does is the sturdy reply from which the child cannot be induced to swerve by any alteration in the form of question until the father recollecting that in the kindergarten a pencil was used and not a knife draws a long one from his pocket, holds it in the same way and then gets the wished for answer I calls it *vertical* All the concomitants of the kindergarten experience had to recombine their effect before the word vertical could be reawakened

Professor Bain in his chapters on Compound Association has treated in a minute and exhaustive way of this type of mental sequence and what he has done so well need not be here repeated [1]

Impartial Redintegration

The ideal working of the law of compound association were it unmodified by any extraneous influence would be such as to keep the mind in a perpetual treadmill of concrete reminiscences from which no detail could be omitted Suppose for example we begin by thinking of a certain dinner party The only thing which all the components of the dinner party could combine to recall would be the first concrete occurrence which ensued upon it All the details of

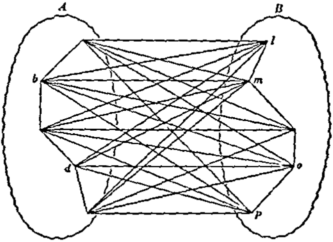


FIG 40

this occurrence could in turn only combine to awaken the next following occurrence and so on If *a b c d e* for instance be the elementary nerve tracts excited by the last act of the dinner party call this act A and *l m n o p* be those of walking home through the frosty night which we may call B then the thought of A must awaken that of B hern a b

... other s action because in the experience B they have already vibrated in unison The lines in Fig 40 (above) symbolize the summation of discharges into each of the components of B and the consequent

[1] I strongly advise the stud nt to read his *Th S s s a d the I tell ct* pp 544 56

strength of the combination of influences by which B *in its totality* is awakened

Hamilton first used the word redintegration to designate all association Such processes as we have just described might in an emphatic sense be termed redintegrations, for they would necessarily lead if unobstructed to the reinstatement in thought of the *entire* content of large trains of past experience From this complete redintegration there could be no escape save through the irruption of some new and strong present impression of the senses or through the excessive tendency of some one of the elementary brain tracts to discharge independently into an aberrant quarter of the brain Such was the tendency of the word heir in the verse from *Locksley Hall* which was our first example. How such tendencies are constituted we shall have soon to inquire with some care Unless they are present the panorama of the past, once opened must unroll itself with fatal literality to the end unless some outward sound sight or touch divert the current of thought.

Let us call this process *impartial redintegration*. Whether it ever occurs in an absolutely complete form is doubtful We all immediately recognize however that in some minds there is a much greater tendency than in others for the flow of thought to take this form Those insufferably garrulous old women those dry and fanciless beings who spare you no detail however petty of the facts they are recounting and upon the thread of whose narrative all the irrelevant items cluster as pertinaciously as the essential ones the slaves of literal fact, the stumblers over the smallest abrupt step in thought are figures known to all of us Comic literature has made her profit out of them Juliet s nurse is a classical example George Eliot s village characters and some of Dickens minor personages supply excellent instances

Perhaps as successful a rendering as any of this mental type is the character of Miss Bates in Miss Austen s *Emma* Hear how she redintegrates

> But where could you hear it? cried Miss Bates Where could you possibly hear it Mr Knightley For it is not five minutes since I received Mrs. Cole s note—no it cannot be more than five—or at least ten—for I had got my bonnet and spencer just ea
> po k—
> so fra
> and see
> and Patty had been washing the kitchen. Oh my dear said I—well and just then came the note A Miss Hawkins—that s all I know— Miss Hawkins of Bath. But Mr Knightley how could you possibly have heard it? for the very moment Mr Cole told Mrs Cole of it she sat down and wrote to me. A Miss Hawkins—

But in every one of us there are moments when this complete reproduction of all the items of a past experience occurs. What are those moments They are moments of emotional recall of the past as something which once was but is gone forever—moments the interest of which consists in the feeling that our self was once other than it now is When this is the case any detail however minute which will make the past picture more complete will also have its effect in swelling that total contrast between *now* and *then* which forms the central interest of our contemplation

Ordinary or Mixed Association

This case helps us to understand why it is that the ordinary spontaneous flow of our ideas does not follow the law of impartial redintegration. *In no revival of a past experience are all the items of our thought equally operative in determining what the next thought shall be. Always some ingredient is prepotent over the rest.* Its special suggestions or associations in this case will often be different from those which it has in common with the whole group of items; and its tendency to awaken these outlying associates will deflect the path of our revery. Just as in the original sensible experience our attention focalized itself upon a few of the impressions of the scene before us, so here in the reproduction of those impressions an equal partiality is shown, and some items are emphasized above the rest. What these items shall be is, in most cases of spontaneous revery, hard to determine beforehand. In subjective terms we say that *the prepotent items are those which appeal most to our* INTEREST.

Expressed in brain terms, the law of interest will be: *some one brain process is always prepotent above its concomitants in arousing action elsewhere.*

Two processes [says Mr. Hodgson][1] are constantly going on in redintegration. The one a process of corrosion, melting, decay; the other a process of renewing, arising, becoming. . . . No object of representation remains long before consciousness in the same state, but fades, decays, and becomes indistinct. Those parts of the object, however, which possess an interest resist this tendency to gradual decay of the whole object. . . . This inequality in the object—some parts, the uninteresting, submitting to decay; others, the interesting parts, resisting it—when it has continued for a certain time, ends in becoming a new object.

Only where the interest is diffused equally over all the parts (as in the emotional memory just referred to, where, as all *past*, they all interest us alike) is this law departed from. It will be least obeyed by those minds which have the smallest variety and intensity of interests—those who, by the general flatness and poverty of their æsthetic nature, are kept for ever rotating among the literal sequences of their local and personal history.

Most of us, however, are better organized than this, and our musings pursue an erratic course, swerving continually into some new direction traced by the shifting play of interest as it ever falls on some partial item in each complex representation that is evoked. Thus it so often comes about that we find ourselves think...

[illegible] other. Thus, for instance, after looking at my clock just now (1879), I found myself thinking of a recent resolution in the Senate about our legal tender notes. The clock called up the image of the man who had repaired its

[1] *Time and Space*, p. 266. Compare Coleridge: "The true practical general law of association is this: that whatever makes certain parts of a total impression more vivid or distinct than the rest will determine the mind to recall these in preference to others equally linked together by the common condition of contemporaneity or of contiguity. But the will itself by confining and intensifying the attention may arbitrarily give vividness or distinctness to any object whatsoever." (*Biographia Literaria*, chap. v.)

gong. He suggested the jeweller's shop where I had last seen him; that shop, some shirt-studs which I had bought there; they, the value of gold and its recent decline; the latter, the equal value of greenbacks, and this, naturally, the question of how long they were to last, and of the Bayard proposition. Each of these images offered various points of interest. Those which formed the turning-points of my thought are easily assigned. The gong was momentarily the most interesting part of the clock, because, from having begun with a beautiful tone, it had become discordant and aroused disappointment. But for this the clock might have suggested the friend who gave it to me, or any one of a thousand circumstances connected with clocks. The jeweller's shop suggested the studs, because they alone of all its contents were tinged with the egoistic interest of possession. This interest in the studs, their value, made me single out the material as its chief source, etc., to the end. Every reader who will arrest himself at any moment and say, "How came I to be thinking of just this?" will be sure to trace a train of representations linked together by lines of contiguity and points of interest inextricably combined. This is the ordinary process of the association of ideas as it spontaneously goes on in average minds. *We may call it* ORDINARY, *or* MIXED, ASSOCIATION.

Another example of it is given by Hobbes in a passage which has been quoted so often as to be classical:

In a discourse of our present civil war, what could seem more impertinent than to ask (as one did) what was the value of a Roman penny? Yet the coherence to me was manifest enough. For the thought of the war introduced the thought of the delivering up the King to his enemies; the thought of that brought in the thought of the delivering up of Christ; and that again the thought of the thirty pence, which was the price of that treason: and thence easily followed that malicious question; and all this in a moment of time; for thought is quick.[1]

Can we determine, now, when a certain portion of the going thought has, by dint of its interest, become so prepotent as to make its own exclusive associates the dominant features of the coming thought—can we, I say, determine *which* of its own associates shall be evoked? For they are many. As Hodgson says:

The interesting parts of the decaying object are free to combine again with any objects or parts of objects with which at any time they have been combined before. All the former combinations of these parts may come back into consciousness; one must; but which will?

Mr. Hodgson replies:

comes out and arranges itself in its old position; but scarcely has the process begun, when the original law of interest begins to operate on this new formation, seizes on the interesting parts and impresses them on the attention to the exclusion of the rest, and the whole process is repeated again with endless variety. I venture to propose this as a complete and true account of the whole process of redintegration.

In restricting the discharge from the interesting item into that channel which is simply most habitual in the sense of most frequent, Hodgson's account is assuredly imperfect. An image by no means always revives its most frequent as-

[1] *Leviathan*, pt. I, chap. III, ...

sociate although frequency is certainly one of the most potent determinants of revival If I abruptly utter the word *swallow* the reader if by habit an ornithologist will think of a bird if a physiologist or a medical specialist in throat diseases he will think of deglutition If I say *date* he will if a fruit merchant or an Arabian traveller think of the produce of the palm if an habitual student of history figures with A D or B C before them will rise in his mind If I say *bed bath mornin* his own daily toilet will be invincibly suggested by the combined names of three of its habitual associates But frequent lines of transition are often set at naught The sight of C Goring s *System der kritischen Philosophie* has most frequently awakened in me thoughts of the opinions therein propounded The idea of suicide has never been connected with the volumes. But a moment since as my eye fell upon them suicide was the thought that flashed into my mind Why? Because but yesterday I received a letter from Leipzig informing me that this philosopher s recent death by drowning was an act of self destruction Thoughts tend then to awaken their most recent as well as their most habitual associates This is a matter of notorious experience too notorious in fact to need illustration If we have seen our friend this morning the mention of his name now recalls the circumstances of that interview rather than any more remote details concerning him If Shakespeare s plays are mentioned and we were last night reading *Richard II* vestiges of that play rather than of *Hamlet* or *Othello* float through our mind Excitement of peculiar tracts or peculiar modes of general excitement in the brain leave a sort of tenderness or exalted sensibility behind them which takes days to die away As long as it lasts those tracts or those modes are liable to have their activities awakened by causes which at other times might leave them in repose Hence *recency* in experience is a prime factor in determining revival in thought [1]

Vividness in an original experience may also have the same effect as habit or recency in bringing about likelihood of revival If we have once witnessed an execution any subsequent conversation or reading about capital punishment will almost certainly suggest images of that particular scene Thus it is that events lived through only once and in youth may come in after years by reason of their exciting quality or emotional intensity to serve as types or instances used by our mind to illustrate any and every occurring topic whose interest is mo t remotely pertinent to theirs If a man in his boyhood once talked [illegible] N[illegible]poleon any mention of great men or historical events battles or thrones [illegible] ine or islands in the ocean will be apt to draw to his [illegible] memorable interview If the word *tooth* now [illegible] reader s eye there are fifty chances out [illegible] Not till [illegible] aken any image it will be an image [illegible] ame b[illegible] as been the sufferer Daily he has [illegible] this very morning he brushed [illegible] in [illegible] the rarer and remoter associ[illegible] f the [illegible] much more intense [2]

shifting play of inte[illegible] representation that is evoked [illegible] selves thinking at two nearly adjace[illegible] whole diamete[illegible]

A fourth factor in tracing the course of reproduction is *congruity in emotional tone* between the reproduced idea and our mood The same objects do not recall the same associates when we are cheerful as when we are melancholy

...h n our utter inability to keep up trains of

...

thoughts In an instant the train of association dances off to ... shine and images of spring and hope. The records of Arctic or African travel perused in one mood awaken no thoughts but those of horror at the malignity of Nature read at another time they suggest only enthusiastic reflections on the indomitable power and pluck of man. Few novels so overflow with joyous animal spirits as *The Three Musketeers* of Dumas Yet it may awaken in the mind of a reader depressed with sea-sickness (as the writer can personally testify) a most dismal and woeful consciousness of the cruelty and carna e of which heroes like Athos Porthos and Aramis make themselves guilty

Habit ecency ... ess and emot onal congru ty are then all reasons why one epresentation rather than another should be awakened by the inter esting portion of a departin thought We may say with truth that *in the majority of cases the com ng epresentat on will have been e ther hab tual recent or ... and will be co gruous* If all these qualities unite in any one absent associate we may predict almost infallibly that that associate of the going thought will form an important ingredient in the coming thought. In spite of the fact, however that the succession of representations is thus redeemed from perfect ndeterminism and limited to a few classes whose characteristic quality is fixed by the nature of our past experience it must still be confessed that an immense number of terms in the linked chain of our representations fall out

...

sociations were much mo e interesting? Both chain and studs had excited brain tracts simultaneously with the shop The only reason why the nerve-stream from the shop-tract switched off into the stud tract rather than into the chain tract must be that the stud tract happened at that moment to lie more open either because of some accidental alteration in its nutrition or because the incip- ie t sub-conscious tensi ns of the brain as a whole had so distributed their eq ilibrium that t was more unstable here than in the chain tract. Any eader s introspection will easily furnish similar instances. It thus remains true that to a certain extent even in those forms of ordinary mixed association which lie near est to impartial redintegration, wh ch associate of the interesting item shall emerge must be called largely a matter of ccident—accident that is for our in telli nce No doubt it is determined by cerebral causes but they are too subtile and shiftin for our analysis.

Association by Similarity

In partial or mixed association we have all along supposed the interesting portion of the disappearing thought to be of considerable extent and to be sufficiently complex to constitute by itself a concrete object Sir William Hamilton relates for instance that after thinking of Ben Lomond he found himself thinking of the Prussian system of education and discovered that the links of association were a German gentleman whom he had met on Ben Lomond Germany etc The interesting part of Ben Lomond as he had experienced it the part operative in determining the train of his ideas was the complex image of a particular man But now let us suppose that that selective agency of interested attention which may thus convert impartial redintegration into partial association—let us suppose that it refines itself still further and accentuates a portion of the passing thought so small as to be no longer the image of a concrete thing but only of an abstract quality or property Let us moreover suppose that the part thus accentuated persists in consciousness (or in cerebral terms has its brain process continue) after the other portions of the thought have faded *This small surviving portion will then surround itself with its own associates* after the fashion we have already seen and the relation between the new thought s object and the object of the faded thought will be a *relation of similarity* The pair of thoughts will form an instance of what is called *Association by Similarity* [1]

The similars which are here associated or of which the first is followed by the second in the mind are seen to be *compounds* Experience proves that this is always the case *There is no tendency on the part of* SIMPLE *ideas attributes or qualities to remind us of their like* The thought of one shade of blue does not remind us of that of another shade of blue etc unless indeed we have in mind some general purpose like naming the tint when we should naturally think of other blues of the scale through mixed association of purpose names and tints together But there is no elementary tendency of pure qualities to awaken their similars in the mind

We saw in the chapter on Discrimination that two compound things are similar when some one quality or group of qualities is shared alike by both although as regards their other qualities they may have nothing in common The moon is similar to a gas jet it is also similar to a foot ball but a gas jet and a foot ball are not similar to each other When we affirm the similarity of two compound things we should always say *in what respect it obtains* Moon and gas jet are similar in respect of luminosity and nothing else moon and foot ball in respect of rotundity and nothing else Foot ball and gas jet are in no respect similar—that is they possess no common point no identical attribute Similarity in compounds is partial identity When the *same* attribute appears in two phenomena though it be their only common property the two phenomena are similar in so

[1] I retain the title of association by similarity [illegible] common usage The reader will [illegible] that [illegible] the same principle throughout [illegible] relation perceived by the mind [illegible] mixed [illegible] But [illegible] the *denotation* of the [illegible] similarity I think it better to sacrifice [illegible] emphasise

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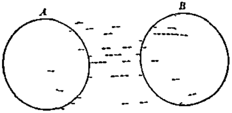


FIG 4

price etc. and because the last named attribute in the foot ball in turn broke away from its companions and itself persisting surrounded itself with such new attributes as make up the notions of a railroad kin of a rising and fall ing stock market and the l ke

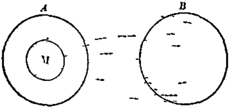
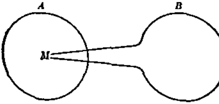


FIG 4

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FI 43

all parts of A are equally operati e in calling up B In mixed most parts of A a e nert The part M *alone breaks out and awakens* B In imilar the focal ized part M is much smaller than in the previous case and after awakenin_ its ne set of associates instead of fading out itself it continues persistently ac ti e al with them f rming an identical part in the two ideas and making these *p ta to* resemble each other

Why a si _le portion of the passing thought should break out from its concert

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[1] I retain the titl f associatio n ity n ord not to p rt f m c mm n usag The reader w ll b h that my n men l tu e s n t bas d n th ame principle throughout Imp tial d nteg t n c nnot s u l p x simil y is n b tive relation perc ived by th m nd d nary x d t n is m h d n tat d. *Total recall* p l ll and f l d all f t s uld l h tt t ms But as the *denot t on* of the l tt r d is lm t id nt c l w th that f t o by similarity I think it better to sacrific p pri ty to popula ty d t k p th l tt w ll w rn phrase

far forth To return now ... ed representations If the thought of the moon is succeeded by th ... of Mr N s railroads it ... away from all the rest a ... ions—elasticity leathery ...

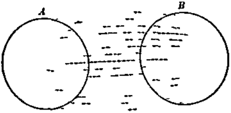


FIG. 4

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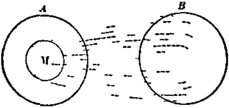


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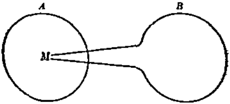


FIG. 43

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Why a single portion of the passing thought should break out from its concert

Association by Similarit

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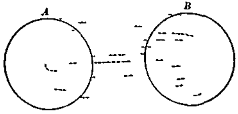


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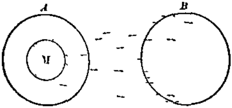
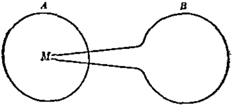


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Why a single portion of the passing thought should break out from its concert

... but not explain Possibly a ... the laws of neural action will some day clear th... possibly neural laws will not suffice and ... action of the form of consciousness upon ... cannot enter now

To sum up then we see that *the difference between th... ation reduces itself to a* ... *the* ... *the*

... ate physiological law of habit ... elements is what *runs* the train The direction of its course and the form of its transitions whether redintegrative associative or similar are due to unknown regulative or determinative conditions which accomplish their effect by opening this switch and closing that setting the ... times at half speed and count ...

an ... ec ... it ... d

... tracts besieged by a ... and those from the ... other It may possibly be that the prepotency of the suggestions of the word *train* at this moment were due to the recent excitation of the railroad brain tract by the instance of a railroad king playing foot ball with the stock market

It is apparent from such an example how inextricably complex are all the contributory factors whose resultant is the line of our reverie It would be folly in most cases to attempt to trace them out From an instance like the above where the pivot of the Similar Association was formed by a definite concrete word *train* to those where it is so subtile as utterly to elude our analysis the passage is unbroken We can form a series of examples When Mr Bagehot says that the mind of the savage so far from being in a state of nature is *tattooed* all over with monstrous superstitions the case is very like the one we have ... considering When Sir James Steph... and

... a way of yawing and going stern foremost and not minding the helm for several minutes after it has been put down And finally it is a real puzzle when the color pale blue is said to have

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the similar objects and that its brain tract is energ ι ιω y r
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is extremely common It would be one of the most important of physiological discoveries could we assign the mr h l or chemical difference which makes the thoughts of one brain cling cl
another shoot about in all the law
brains action should tend to foca — —
fills patiently its broad bed it seems impossible to guess Whatever the difference may be t is what separates the man of gen us from the prosaic creature of hab t and routine th nking In Chapter XXII we shall need to recur to this point

Association in Voluntary Thought

Hitherto we have assumed the process of sug estion of one object by another to be spontaneous The train of ima ery wanders at its own sweet will now trudg ng in sober grooves of habit now with a hop skip and jump darting across the whole field of time and space This is revery or musing but great segments of the flux of our ideas consist of something very different from this They are gu ded by a distinct purpose or conscious interest As the Germans say we *nachde ken* or think towards a certain end It is now necessary to examine what modification is made in the trains of our imagery by the having of an end n view The course of our ideas is then called *voluntary*

Physiolog cally considered we must suppose that a purpose means the persistent activity of certain rather definite brain processes throughout the whole cou se of thought Our most usual cogitations are not pure re eries absolute driftings but re olve about some central nterest or topic to which most of the mages are r le ant and towards which we return promptly after occasional di gress ons This interest is subserved by the persistently active brain tracts we have s pposed In the mixed associations which we have hitherto studied the parts of each object which form the pivots on which our thoughts successively turn ha e their interest largely determined by their connection with some *gen al intc est* which for the time has seized upon the mind If we call Z the brain tract of general interest then if the object *abc* turns up and *b* has more asso ciat ons with Z than have either *a* or *c* *b* will become the object s interesting p tal portion and will call up its own associates exclusively For the energy of *b* s brain tract will be augmented by Z s activity —an activity which from lack f p evious connection between Z and *a* or *c* does not influence *a* or *c* If for instance I th nk of Paris whilst I am h gry I shall not improbably find that its *estau nts* have become the pivot of my thought etc etc.

with the rest and act as we say on its own hook why the other parts should become inert are mysteries which we can ascertain but not explain Possibly a minuter insight into the laws of neural action will some day clear the matter up possibly neural laws will not suffice and we shall need to invoke a dynamic reaction of the form of consciousness upon its content But into this we cannot enter now

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s ultimate physiological law of habit among the neural elements *is what runs* the train The dire
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are due to unknown regulative
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This last figure of speech into which I have glided unwittingly affords itself an excellent instance of association by similarity I was thinking of the deflections of the course of ideas Now from Hobbes s tim nt
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from train on the one hand and *those from the movement of thought* on the other It may possibly be that the prepotency of the suggestions of the word *train* at this moment were due to the recent excitation of the railroad brain tract by the *instance of a railroad king playing foot* ball with the stock market

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James Stephen compares our belief
ture the congruity of
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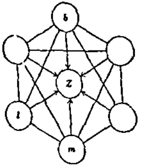
feel ng that we are warm as the cn ul u ... d l en before the attention Thus we

dinner table ... h ht came *à propos* of a c ...

p ocess

those wh ch seem pe tinent and ignore the rest Thro ... attention in the ne ghborhood of the desired object the accumulation of associ ates becomes so great that the combined tensions of their neural processes break through the bar and the nervous v ave pours into the tract which has so long been awaitin its advent And as the expectant sub-conscious itch ng there bursts into the fulness of vivid feeling the mind finds an ine pressible relief

The whole process can be rudely s mbolized in a diagram Call the forgotten thin Z the fir t facts with which we felt it was related *a b* and *c* and the details finally operative in calling it up *l m* and *n* Each circle will then stand for the brain process underlying the thought of the object denoted by the letter contained within it The activity in Z will at first be a mere tens on but as the activi t es in *a b* and *c* little by little irradiate into *l m* and *n* and as *all* these processes are someho v con nected with Z the r combined irradiations upon Z represented by the centripetal arrows succeed in help ng the tension there to overcome the resist ance and in rousing Z also to full activity



Fi 44

The tens on present from the first in Z even in determ ng that *l m n* ... sl wer accumulat on of objects connected w th it But as aforesaid the objects come befo us through the brain s own laws and the Ego of the thinker can only remain n hand as it were to recognize their relat ve values and brood o so e of them whilst others are let drop As when we have lost a material

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ne has described this p ocess b tt than H bbes S metimes man se ks wh t h hath lo t and f m th t place and tim h em h misse t his mi d runs b k f m pla t pla d tim t tim t find whe and wh h h d t that is to say t find som er tai nd limi ed tim d pl e in h h t begin m thod f seeking Again f m th nc his thou ts ru ov th sam places and times t fi d what cu ther occasi n might

But in the theoretic ... tical life there are interests of a ... nges of some ...

... simple presence does not in ... y suggest the means the search for the latter becomes an intellectual *problem* The solution of problems is the most characteristic and peculiar sort of voluntary thinking Where the end thought of is some outward deed or gain the solution is largely composed of the actual motor processes walking speaking writing etc *which lead up to it Where the end is in the first instance* only ideal as in laying out ... are purely imaginary ... a new sort of end of ... before we ... y craving

... *henever we seek to recall something forgotten* or to state the reason for a judgment which we have made intu... *desire strains and presses in* ...

... *presence can ever be The gap be*... es no mere void but what is called an *aching* void If we try to explain in terms of brain action *how a thought which only potentially exists can yet be effective* we seem driven to believe that the brain tract thereof must actually be excited but *only in a minimal and sub conscious way* Try for instance to symbolize what goes on in a man who is racking his brains to remember a thought which occurred to him last week The associates of the thought are the ... of them at least but they ref ...

... rhythm sounds in his ears the ... *ords seem on the imminent point of following but fail What it is that blocks* the discharge and keeps the brain excitement here from passing beyond the nascent into the vivid state cannot be guessed But we see in the philosophy of ... sire and pleasure that such ...

... oning wonder emotion of curiosity *must be referred to cerebral causes of some such form as this* The great difference between the effort to recall things forgotten and the search after the means to a given end is that the latter have not whilst the former have already formed a part of our experience If we first study *the mode of recalling a thing forgotten* we can take up with better understanding the voluntary quest of the unknown

The forgotten thing is felt by us as a gap in the midst of certain other things If it is a thought we possess a dim idea of where we were and what we were about when it occurred to us We recollect the general subject to which it relates But all these details *refuse to shoot together into a solid whole for the lack* of the vivid traits of this missing thought the relation whereof to each detail forms now the main interest of the latter We keep *running over the details in* our mind dissatisfied craving something more From each detail there radiat

lines of association forming so m
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ately from consciousness Other
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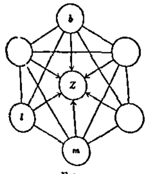


FIG 44

The tens on present from the first in Z even though t keep below the threshold of dischar e is probably to some degree co-operati e with *a b c* in d term that *l m n* shall awake Without Z s tension there might be a slo er accumulation of objects connected with it But as afo esaid the objects c me befor us through the brain s own laws and the E o of the thinker can only remain on ha d as it were to recognize their relative values and brood o e me of them wh lst others are let drop As when we have lost a material

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d limited tim d pl in h b t b gin m th d f se king Again f m th
b th ughts th sam pla es and times t fi d what cu ther oc as might

Turn now to the case of finding the unknown means to a distinctly conceived end The end here stands in the place of *a b c* in the diag ... rting point of the irradiation of ...

... discharge all together ... ement of ... l sphere equivalent to the solution of our problen ... this case and the last is that in this one there need be no original sub excitement in Z co operating from the very first When we seek a forgotten name we must suppose the name s centre to be in a state of active tension from the very outset because of that peculiar feeling of *recognition* which we get at the moment of recall The plenitude of the thought seems here but a maximum degree of something which our mind divined in advance It instantaneou ... d to its sh ... ir

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... of *acquaint* ...

... Our intui ... rn up is at last our *quæsitum* is due to our recognition that its relations are identical with those we had in mind and this may be a rather slow act of judgment In fact every one knows that an object may be for some time present to his mind before its relations to other matters are perceived To quote Hodgson again

The mode of operation is common to voluntary memory and reason But reasoning adds to memory the function of comparing or judging the images which arise Memory aims at filling the gap with an image which has at some particular time filled it before reasoning with one which bears certain time and space relations to the images before and after —

or to use perhaps clearer l ... cal re- ... This ... up before we get the material quality of the thing related will surprise no one who has read Chapter IX

From the guessing of newspaper enigmas to the plotting of the policy of an empire there is no other process than this We trust to the laws of cerebral nature to present us spontaneously with the appropriate idea

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... ys ... n ... s o e would swe p a room to find a jewel ... as a span l ranges the field till he find a scent or as a man should run over th alphabet to start a rhym (*Let th* part I ch III)

[1] *Theo y of Practice* vol I p 394

"Our only command q er it is by the effort we make to keep the painful unfilled gap in consciousness. Two circumstances are important to notice the first is that ou o h s o power of callin up images, but nl of rejectin, and sel cting f om those ered by spontaneous edintegration. But the rap dity with which this selec tio is made owing to the familiarity of the ways in which pontaneous redintegration runs, gi es the process of reasoning the ppearance of ev kin images that are fore-seen to be conformab e to the purpose fered there is n summoning them be that every kind of reasoning is nothin ...

It is foreign to our purpose here to enter into any detailed analysis of the dif ferent classes of mental pursuit In a scientific research we get perhap as rich an example as can be found The inquirer starts with a fact of which he seeks the re or with an hypothesis of which he seeks the proof In either case he keeps ciate to suit his need ... the investigator may proceed traight to his result but both here and in the case of reminiscence the accumulation of helps in the way of associations may ad ance more rap dly by the use of certain routine methods In stri ing to recall a thought for example we may of set purpose run through the successive classes *of circumstance* with which it may possibly have been connected trusting that when the right member of the class has turned up it will help the thought s revival Thus we may run through all the *places* in which we may have had it We may run through the *persons* whom we remember to have con ersed with or we may call up successively all the *books* we have lately been reading If we are try ing to remember a person we may run through a list of streets or of professions. Some item out of the lists thus methodically gone over will very likely be associated with the fact we are in need of and may suggest it or help to do so And yet the item might never ha e arisen without such systematic procedure In scientific research this accumulation of associates has been methodized by Mill under the title of The Four Methods of Experimental Inquiry By the method of agreement b that of difference by those of residues and concomitant variations (which cannot here be more nearly defined) we make certain lists of cases and by ruminating these lists in our minds the cause we seek will be more likely to emerge. But the final stroke of discovery is only prepared not effected by them. The brain tracts must of their own accord hoot the right way at last, or we shall still grope in darkness That in some brains the tracts *do* shoot the right way much oftener than in others, and that we cannot tell why —these are ultimate facts to which we must never close our eyes E en in f rmin our lists of instances according to Mill s methods we are at the mer cy of the spontaneous workings of Similarity in our brain How are a number of facts, resembling the one whose cause we seek to be brought together in a list unless the one will rapidly suggest the other through association by similarity?

Ibid p. 3.4. All associatio is called redintegrati by Hodgson.

I id p. 400. *Cf* Bain, *The Em tions and the Will* p. 377 "The ttg ... f th mind are necessarily random the end alone is th thing that is clear to the iew and with that there is perception of the fitness f every passing suggestion. The *voliti nal energy* keeps up the attention on the ctive search and the moment that anythin in point rises bef re the mind, it springs upo that like wild beast upon its prey

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... ise in its first intention [1] Our intuition that one of the ideas which turn up is at last our *quæsitum* is due to our recognition that its relations are identical with those we had in mind and this may be a rather slow act of judgment In fact every one knows that an object may be for some time present to his mind before its relations to other matters are perceived To quote Hodgson again

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the investigator may proceed traight to his result of reminiscence the accumulation of helps in the way of associations may ad vance more rap dly by the use of certain routine methods In striving to recall a thought for example we may of set purpose run through the successive classes of circumstance with which it may possibly have been connected trusting that when the right member of the class has turned up it will help the thought s re- vival Thus we may run through all the *places* in which we may have had it We may run through the *persons* whom we remember to have con ersed with or we may call up success vely all the *books* we have lately been reading If we are try ing to remember a person we may run through a list of streets or of professions Some item out of the lists thus methodically gone over will very likely be asso- ciated with the fact we are in need of and may suggest it or help to do so And yet the item might never have arisen without such systematic procedure In sci entific research this accumulation of associates has been methodized by Mill under the title of The Four Methods of Experimental Inquiry By the method of agreement by that of difference by those of residues and concom tant variations (which cannot here be more nearly defined) we make certain lists of cases and by ruminating these lists in our minds the cause we seek will be more likely to emerge But the final stroke of discovery is only pre- pared ot effected, by them The brain tracts must of the r own accord shoot the ght way at last or we shall still grope in darkness That in some brains the

p the ttention the cu search and th m m t th t anything in point rises bef re th mind, it brings po that like wild beast po ts prey

Similarity No Ele[ment]

... as so[...] [...] be observed that the *object cal[...] [...] y logical relation whate[v]er to the one which suggested it* The law requires only that one condition should be fulfilled The fading object must be due to a brain process some of whose elements awaken through habit some of the elements of the brain process of th[...] [...] view This awakening is th[...] [...]ghout [...] similar [...] [...] between the objects or between the ([...] [sim]ilarity there be between these latter) has no causal agency in carrying us from one to the other It is but a result—the effect of the usual causal agent when this happens to work in a certa[in] [...] [...]le way But ordinary wr[...] [...]n

[...] The similarity of two things [...] [b]oth things are there—it is meaning[less] [...] [a]gent *of production* of anything [...] It is [...] re [...] of sub[...] [...] an object and some second object [...] associative machinery calls up [2]

There are neverth[...]

[...]ng [...] [th]rough first reviving an image *a* [...] past occurrence *This* is the term directly connected with *b* so that the process instead of being simply A—*b* is A—*a*—*b* Now A and *a* are similars therefore no association by contiguity can occur except th[...] previous association by similarity Th[...] [...] is that every [...] past self in [...] the intermedi[...]

[...] *L*[o]*gic* p[...] [...]ries [...] p [...] *Th*[...] y [...] [...]gy p 60 While in [...] [...]

[...] pp 4 0–31

[2] Dr McCosh [...] [a]ccordingly only log[i]cal wh[e]n he sinks sim[i]larity in wh[a]t he calls the "*Law of Correlat[i]on* according to wh[i]ch when we ha[ve] discovered *a* [...] the idea of one tends to bring up the [o]thers (*P*[sy]*ch*[o]*l*[o]*gy* the C[o]gniti[v]e P[o]w[er]s p 130) The relations me[ntione]d [...] [...]ity Whol[e] [a]nd Parts Res[e]mbl[a]nc[e] Spa[c]e [...] [...]ff[e]ct [...] perce[i]ved [r]elat[i]ons among objects b[e]fo[r]e the mind similarity has of course pl[a]c[e]

A t ntical and auditory im

blindness (see p
ages to interpret
that auditory se—
non auditory images and optical sensations on y — —
optical images In the chapters on Memory on Reasonin and on Perception
the same assumption will meet us again and again will have to be rejected as
groundless The ensational process A and the ideational process *a* probably oc
cupy essentially the same tracts When the outer stimulus comes and those
tracts vibrate with the sensation A they discharge as directly into the paths
B as when there is no outer stimulus and they only vibrate with
h these paths by the help of

he weak p — nlaus p

Contrast *has also been held to be an independent agent in association* But
the reprod ction of an object contrasting with one already in the mind is easily
explained fact all reduce it either to simi
larity or c
the *ext e*
reprod
memory

I trust that the student will now feel that the way to a deeper understanding
of the order of our ideas lies in the direct on of cerebral physiology The *eleme
tary* process of rev al can be nothin but the law of habit Truly the day is dis-
tant when physiolo ists shall actually trace from cell group to cell group the ir
radiations which we have hypothetically invoked Probably it will never arrive
The schematism we have used is mo eover taken immediately f om the anal
ysis of objects into their elementary parts and only extended by analogy to the
bra And yet it is only as incorporated in the brain that such a schematism can
represent anything *causal* This is to my mind the conclusive reason for saying
that th order of *p esentat on of the mi d s materials* is due to cerebral physi
l gy alone

The law of accidental prepotency of certain processes over others falls also
within the sphere of ce ebral pr babilities G anting such instability as the
brain tiss e equires certain points must always discharge more quickly and

Cf Bain, *The Sen nd th Int lle t* p 564 ff J S Mill n te 39 to J Mill s *Analy-
sis* Lipps *Grundtatsach* p. 97

... ... mechanical diagram of the ca... ...ous play of similar association in the most gifted mind The study of dreams confirms this view The usual abundance of paths of irradiation seems in the dormant brain reduced A few only are pervious, and the most fantastic sequences occur because the currents run— like sparks in burnt up paper — wherever the nutrition of the moment creates an opening but nowhere else

The *effects of interested att*... ...em ... m ...d *This* is the point it ... make it st... ...

... ...ociative machinery has already introduced or tends to introduce If it can emphasize reinforce or protract for a second either one of these it can do all that the most eager advocate of free will need demand for it then decides the direction of the next associations by making them hinge upon the emphasized term and determining in this wise the course of the man s thinking it also determines his acts

The History of Opinion Concerning Association

may be briefly glanced at ere we end the chapter [1] Aristotle seems to have caught both the facts and the principle of explanation but he did not expand his views and it was not till the time of Hobbes that the matter was again touched on in a definite way Hobbes first formulated the problem of the succession of our thoughts He writes in *Leviathan* Chapter III as follows

By consequence or train of thoughts I understand that succession of one thought to another which is called to distinguish it from discourse in words *mental discourse* When a man thinketh on anything whatsoever his next thought after is not altogether so casual as it seems to be Not every thought to every thought succeeds indifferently But as we have no imagination whereof we have not formerly had sense in whole or in parts so we have no transition from one imagination to another whereof we never had the like before in our senses The reason whereof is this All fancies are motions within us relics of those made in the sense and those motions that immediately succeeded one another in the sense continue also together after sense insomuch as the former coming again to take place and be predominant the latter followeth by coherence of the matter moved in such manner as water upon a plane table is drawn which way any one part of it is guided by the finger But because in sense to one and the same thing perceived sometimes one thing sometimes another succeedeth it comes to pass in time that in the imagining of anything there is no certainty what we shall imagine next only this is certain it shall be something that succeeded the same before at one time or another This train of thoughts or mental

[1] See for fu the d tails Hamilton s *R d* ppendices D * nd D and L Ferri *La Psycholog e de l association* (Paris, 1883) Also Rob rtson *Encyclopædia Britannica* article Association

discourse s of two s ts The fir t is *guided tl out design* and inconstant where in there is no pas nate thou ht to go ern and direct those that follow to itself as the end and scope f some des re or other pas on. The second is mo e constant as being *regulated* by s me de ire and desi n F r the impression made by such things as we desi e or fear is tro g anc if it cease for a time of quick return so st ong is it sometimes desire ariseth the th u ht of some mea s

e aim t and f om the thought of that continually till we com to some b ginni g w thin our o n po er And b ca end by the greatness of the imp es n comes often to mind in ca e ur thoughts begin to wa der they are quickly in reduced to the way which bserv d by one of the seve w e men made him gi e men this p ecept which is now worn out *Resp ce fi* that s to say in all y ur ct ons look often upon hat you would ha as th thing that di ects all your th ughts in the way to attain it

Th t r f egulated th ughts s of two kinds one when of an effect imagined w s d h r mmon to man d beast

The

c

ha

curi

but ensual s ch as e hunger thi st

mind when t s go rn d by des gn

t o which the Latins called *sag citas* and *s llertia* a hunting o t f the c uses or s m eff ct p e ent o pa t or of the effects of some pr ent r pa t c use

The most important passage after this of Hobbes is Hume s

As all simple deas m y be s pa at d by the imagin tio and m y be united gain what form ld be m una co t bl than the ope tio s f

th t f culty

mea ure uni

ect d

sh ld fall gularly int

f unio amo g them

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t e we t c l d t

m f than that

mm ly p e ails

rr po d t each o

wh h e mo t p pe to e uni

t ari and by which the mind aft r this mann c ey d fr m o e dea to anoth are three viz. RESEMBLANCE CO TIGUITY in time or plac and CAU E and EFFECT

I t leve t will t be ery e essary t pro e that the qu l t es p od e an or t mo g deas a d upo th appea ance f one dea naturally int oduc an

them eul ly and t ke them as they li *co t g us* to ea h oth r the imaginat on must by l g ustom cqui the sam meth d f thinking and ru lo g th parts f pa e and time in cei g t bjects As to the connecti n that s mad by the elation f c us *and ff t* we shall ha e occa aft rwa ds to examine t to the

bottom and therefore shall not at present insist upon it 'Tis sufficient to observe that there is no relation which produces a stronger connection in the fancy and makes one idea more readily recall another than the relation of [illegible] fect betwixt their objects These [illegible] g our [illegible] ction [illegible] ch in [illegible]

[illegible] ideas alone was reserved for Hart[illegible] James Mill[3] These authors traced minutely the presence of association in all the cardinal notions and operations of the mind The several faculties of the Mind were dispossessed the one principle of association between ideas did all their work As Priestley says

[illegible] pleasures and pains but all the phe[illegible] memory imagination volition reasoning and every other mental affection and operation are but different modes or cases of the association of ideas[4]

An eminent French psychologist M Ribot repeats Hume s comparison of the law of association with that of gravitation [illegible]

[illegible] om of all our acts that it per[illegible] ption that [illegible] y nor the most ab[illegible] be equivalent to that [illegible] for one cannot sen[illegible] ttered lines in Aristotle and the Stoics c[illegible] stitute a theory and clear view of the sub[illegible] t we must [illegible] covery of [illegible] any other [illegible]

[illegible] s superior [illegible] he most extended usage consists as we know in dividing intellectual phenomena into classes in separating those which differ in grouping together those of the same nature and in giving to the e a common name and in attributing them to the same cause it is thus that we have come to distinguish those diverse a pects of intelligence which are called judgment reasonin ab straction perception etc Th[illegible] isely the one followed in Physics where [illegible] e the unknown causes of certain gr ups [illegible] the diverse faculties are only the un[illegible] es of known phenomena that they are simply a convenient means of clas[illegible] fying the facts and peaking of them if one does not fall into the common fault of making out of them substantial entities creations which now a ree now d sagree so

[1] *T eal se of Human N tu e* part 1 § [illegible] [2] *Ob e vat ons on Man* (Lond n 1749)
[3] *Analys s of the Phenome a of the H m n M nd* (1829)
[4] *Hartley s Th ory* 2d ed (1790) p xxvii. Cur nt th t is in Fr nce

those who ttribute its p
cal nc li ht etc f om
ea h ae of them s nly a pains v
which t co tains and s gnifies no
o the c ntr ry sh ws th t the
cas s f a ngle law that imagin
so ma y d terminate ways in wh
th differences of faculties are only dif ren es of association It *exp ains* ...
tual facts certainly not fter the manne of Metaphys cs which demands the ultimate and absol te reason of thing but after the manner f Physics which seeks only their se ondary d immediate cause [1]

The inexperienced reader may be glad of a brief indication of the manner in wh ch all the different mental operations may be conceived to consist of images of sensation associated together

Memory is the association of a present image with others known to belong to the past. *Expectation* the same with future substituted for past *Fancy* the as

long as the sensation persists the image cannot be exclud

Judgme t is transferrin the idea of *truth* by association from one proposi tion to another that resembles it.

R son g is the perception that whatever has any mark has that which it is a mark of in the concrete c h mark or middle term being always *asso ciated* with each of the other
themsel es indi ectly associat
sible experience associated with anoth

ther erves to explain emotional facts When we are pleased or hurt we express it and the exp ess on assoc ates itself w th the feelin Hearin the same expres s f om an ther revives the associated feeling and we *sympathi e* i e grieve are glad w th him

The other social affections *Benevolence Conscientiousness Ambit on* etc arise in like manner by the transfer of the bodily pleasure experienced as a rewa d for social service and hence associated with it to the act of service itself the l nk of reward being dropped out Just so *Avarice* when the miser transfers the bodily pleasures associated with the spending of money to the money itself d opping the link of pending

F a transfer of the bodily hurt as ociated by experience with the thing

[1] La P y h l g A glai p 4 Priestley p u p xxx.

with the idea of the object capable of affording them The experiences them selves may cease to be distinctly imagined after the notion of their pleasure has been transferred to the object constituting our love therefor

Volition is the association of ideas of muscular motion with the ideas of those pleasures which the motion produces The motion at first occurs automatically and results in a pleasure unforeseen The latter becomes so associated with the motion that whenever we think of it the idea of the motion arises and the idea of the motion when vivid causes the motion to occur This is an act of will

Nothing is easier than for a philosopher of this school to explain from experience such a notion as that of infinitude

> He sees in it an ordinary manifestation of one of the laws of the association of ideas —the law that the idea of a thing irresistibly suggests the idea of any other thing which has been often experienced in close conjunction with it and not other wise As we have never had experience of any point of space without other points beyond it nor of any point of time without others following it the law of indissoluble association makes it impossible for us to think of any point of pace or time however distant without having the idea irresistibly re [illegible] other points [illegible] f these two [illegible] and we are [illegible] we should be just as unable as we now are to conceive the idea [1]

These examples of the Associationist Psychology are with the exception of the last very crudely expressed but they suffice for our temporary need Hartley and James Mill[2] improved upon Hume so far as to employ but a single principle of association that of contiguity or habit Hartley ignores resemblance James Mill expressly repudiates it in a passage which is assuredly one of the curiosities of literature

> I believe it will be found that we are accustomed to see like things together When we see a tree we generally see more trees than one a sheep more sheep than one a man more men than one From this observation I think we may refer resemblance to the law of frequency [i e contiguity] of which it seems to form only a particular case

Mr Herbert Spencer has still more recently tried to construct a psychology which ignores Association by Similarity [3] and in a chapter which also is a curiosity he tries to explain the association of two ideas by a conscious reference of the first to the point of time when its sensation was experienced which point of time is no sooner thought of than its content namely the second idea arises Messrs Bain and Mill however and the immense majority of contemporary psychologists retain both Resemblance and Contiguity as irreducible principles of Association

Professor Bain s exposition of association is by common consent looked upon as the best expression of the English school Perception of agreement and differ

[1] Review of Bain s *Psychology* by J S Mill [illegible]

[illegible] us p cies and so far as may be the same variety [illegible] e sole process of association of feelings as any equivalent for what [illegible] wn as Ass ciation by similarity

ence retentiveness and the two sorts of association contiguity and similarity ... h him re arded as constituting all that is meant by intellect proper His ... des r ptive point of view though

lected by the British school before Da... exemplification As an instructive passage the following out of many equally good may be chosen to quote

We may ha e similarity in di e s ty f form A rope ugg but lo ki g to the *use* t ma a leather b d or bevelled g t rns n what ans e s a c m pear ces the e w'll be the u e f on the other ha d effi ency as a tool the pe u shall be r eady to e n alth ugh di r in all other tw c a h s steam-e gi e a d wate r w ... Th d tv these had no doubt for a lo g t

so diffe ent We ca s e by inst e l ke thi w w ... m hin ry might rise in the mind of mechan cal in e to Whe it first occurred to a refl ting mind that mo ing water h d a p perty ident cal th human o brute f rc nam ly the p perty of etting other masses n motio ov coming inert a a d es tanc — hen th ght of the tream ugge ted through this p t f lik ess the po f th animal — ew addit o w m de to the class f prime mo s and he c umsta c permitted th s power could become sub t tute for the other It m v m t th mod rn unde tandin famil w th wate whe l and drift g ft that the similarity her was a e t emely b ous e B t if e put o elves t k l t t f m d wh running wate ffect d the mind by its brilli

kn wn sour of mechan cal fo ce To th ommo ye fo ages por p esented t lf a cl d in the sky as a hissing n at th pout f a kettle w th the f rmat f a foggy cu li g cloud at a few hes distance Th forcing up of the

with the idea of the object capable of affording them The experiences them selves may cease to be distinctly imagined after the notion of their pleasure has been transferred to the object constituting our love therefor

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... y point of ...

... having th ...

... and we are ... we should ... the idea

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[1] Rev w of Ba n s P y l ol gy by J S Mill in Ed b R ... Oct ... p 293
[2] *A aly s f the Pl ...* m ... gy vol I ... pe ... d

p ... fee ... s pecies a d ... far as may b ... the sam ... vari ... wh ch Spe ce calls (p 257) the s l p cess of as ciati n of feeli gs as any equivale t for what is commonly known as As o at o by ... milarity

r· lv and acutely than any one His treatment of it though short seems to
I H dcson s

of the immense part which it plays in
mit that few princ ples of analysis in any science have proved more fertile than
this or ... ted it often may have been Our o vn attempt
to for
causa
servic
view

when one n

on the one hand and brain processes on t
ties and operations is as conclusive in these terms as in those trad tionally used

M F H B dl y seem t m t b bee gu lty f som th g y l k th s g o l o lenchi in the, t rse btle d w tty b t d cidedly lo g wind d cr t q f th association f d as, tain d in bo k II, p rt II, ch p 1, f his *P ... L gic*

kind and we are no to give the explanation of their superiority The tained all the elements preparatory to a great —a high susceptibility both by nature and by edu of bodies or famil u indifferen It is not u all these uding common abilities They would en to a mechanical education almost as a matter of course That the discovery was not sooner made supposes that something furth of com mon occurrence was necessary o be the identif s in the l is con

tic ideas pposition has cal if more re- u his followers who until be said to have reigned almost su idea s but the act ch the other into the mind The inge which most special cases of association are formulated in this me chanical language of struggle and inhibition is great and nalytic thoroughness anything th [1] wever and I ie glib Her ussen and their *Hemmungen* and *Hem ungssummen* and *sinken* and *erheben* and *schweben* and *Verschmel ungen* and *Complexionen* Herr Lipps the most recent systematic German psychologist has I regret to say carried out the theory of ideas in a way which the great originality learning and acuteness he shows make only the more regrettable Such elaborately artificial constructions are it seems to me only a burden and a hindrance not a help to our science [6]

In French M Rabier in his chapter on Association [7] handles the subject more

[1] *The S n es and the Intell ct* pp 491–93

[2] See his *Time and Space* chap and his *Theo y of P act ce* 57

[3] *Psycholog e als Wissenschaft* (182

[4] has gi n a g od acc a l gue S also two by G F Stout in *Mind* for 1888 J D M rell's *Outl es of Ment l Philosophy* (2d ed. London 1862) lar ely follo s Herba t nd Beneke I know f no ther Engl sh b ok which does so

[5] See his *G ndt ts d en des B wus ts ns* (1883) chap vi et passim e p c lly pp 106 ff 364

[6] The most bu de some and utterly gratu tous of them are perl p Steinthal's, in his *Ei le tu g n d e Psycholog e* 2d ed (1881) *Cf* lso G Glogau *St i thal's P y h l g sche Fo mel* (1886)

[7] *Leçons de philosophie* i *P ychologie* ch p xvi (1884)

vigorously and acutely than any one His treatment of it thou h short seems to me for general soundness to rank second only to Hod son s

In the last chapter we already invo ed association to account for the effects of use in improving discrimination. In later chapters we shall ee abundant proof of the immense part which it plays in other processes and shall then read ly ad mit that few principles of analys in any science have proved more fertile than this one however vaguely formulated it often may have been Our own attempt to formulate it more definitely and to escape the usual confusion between causal agencies and relations merely known must not bl nd us to the immense services of those by whom the confusion was unfelt. From this practical point of view it would len ht to flatter one s self that one has dealt a heavy blow
of atomistic
only be the
psychology
on the one hand and brain processes on the other and the analys s of fac ties and operations is as conclusive in these terms as in those traditionally used

M F H Bradley seems t m t ha been guilty f som thing ery lik this g 1 o *knocks* in the, f course bu d witty b t d cidedly long winded critiq f the associati f ideas, co tained in book ii, part ii, ch p i, f his *Principl* f *Logic*.

Chapter XV

THE PERCEPTION OF TIME

In the next two chapters I shall deal with what is sometimes called internal perception or the perception of *time* and of events as occupying a date therein especially when the date is a past one in which case the perception in question goes by the name of *memory* To remember a thing as past it is necessary that the notion of past should be one of our ideas We shall see in the chapter on Memory that many things come to be thought by us as past not because of any intrinsic quality of their own but rather because they are associated with other things which for us signify pastness But how do these things get *their* pastness? What is the *original* of our experience of pastness from whence we get the meaning of the term? It is this question which the reader is in t d o consider in the present chapter We h n *cnents* think ie ob ear affected by this quality This is the original of our notion of past time upon which memory and history build their systems And in this chapter we shall consider this immediate sense of time alone

If the constitution of consciousness were that of a string of bead like sensations and images all separate

we never could have any knowledge he moment each of je as if we had neve Even if our id only as they are in imagination we should still be without the capacity of acquiring knowledge One idea upon this supposition would follow another But that would be all Each of our successive states of consciousness the moment it ceased would be gone forever Each of those momentary states would be our whole being[1]

We might

word except the ue right policy without ever a gl of the tot of our choice Our consciousness ing the point it immediately cov Whether a very highly developed e be possible under such conditions as these is more than doubtful it is however conceivable

I make the fanciful hypothesis merely to set off our real nature by the contrast Our feelings are not thus contracted and our consciousness never shrinks to the dimensions of a glow worm spark *The knowledge of some other part of*

[1] James Mill *Analysis* v I p 319 (J S Mill s edition)

the stream past or future near or remote is always mixed in with our knowledge of the present thing

A simple sensation as we shall hereafter see is an abstraction and all our concrete states of mind are rep[illegible] w h some amount of complexity Part of the complex[illegible]

de

sc

b[illegible]

up the loss These germs of memory a[illegible] of time They give [illegible] be c

f seq en is th t tal f d ration. T m -d ti

hat in an isol ted m ment, w — b-f elings m in seq en — W d t qui t kn w th t th in any artificially is l ted mini t kn w wh t ming in seq en means. B t w h m m f nsci ess th *ud m t* f th p cepti n f f m and latt r in tim in the b-feeling th t g w fai t and the b f ling that gr ws tr ger and the change between th m

I th ext pl I m k th t th f nsci usness Th first beginnings f gs f per epti d A h memb th t minim m th n h alth gh both rud m t f m m ry f h gs is th lt m t xplan ti d this is wh t is mean d latt sa ing th t f m f sen d f t d ded b What l as min

ta

b

few seconds, min tes bey d which w specu — th present h day) t ry

B t this pop lar y f thinking imposes tself g t mbers en f phil phically minded pe ple d they talk bo t th *pr* t as if t was *dat m*—as if tim cam t us mark d int present periods lik meas ring t p (S H. H dgso *Phil phy f R flec tio* I. pp 48–54)

"The p ese tati f tim ag ees th th t f sp in th t t in m t f t must be prese ed together—incl d d bet en ts init l and t rm nal limit A tim us idea tion, flo ing f m one point to another w uld indeed *py* tim b t t *pr* t f r

The Sensible Present Has Duration

Let any one try
moment of time O
present? It has mel ... ned ere we could touch it, gone in the in-
stant of becoming As a poet quoted by Mr Hodgson says

Le moment où je parle est déjà loin de ...

... zed in sense but probably never
... conceived of by those unaccustomed to philosophic meditation Reflection
leads us to the conclusion that it ... t can never be a
... ate experience is
... s words deserve

The relation of experience to t...

... um refers is really a part of
... me that intervenes between
... ent and let the past that is
... All the notes of a bar of a
... All the changes of place of
... the beholder to be contained in the present At the instant of the
termination of such series no part of the time measured by them seems to be a past
Time then considered relatively to human apprehension consists of four parts viz
the obvious past the specious present the real present and the future Omitting the
specious present it consists of three nonentities—the past which does not exist
the future which does not exist and their conterminous the present the faculty
from which it proceeds lies to us in the fiction of the specious present

---

... ther instead of gra p ng the whole suc
... end—are equally essential to the con
... ness together (Herbart *Psychol* ...

§ 115)
Assume that ... similar pendulum strokes follow each other at regular intervals in a
consc ousness otherwise vo d When the first one is over an image of it remains in the fancy
until the econd succeeds This then reproduc s the f rst by virtue of the law of ssociati n
by simila it) but at the sa ne time meets with the aforesaid persisting image Thus does
the imple repetition of the sound provide all the elements of time pe cep tion The first
sound (as it is recalled by association) gives the begi ning the sec n l the end and the per
sistent image in the fancy represents the l ngth of the interval At the moment f the sec
ond mpression the ntire time percept on exists at nce f r th n all its elem nts a e re
sented together the cc nd sound and the image in the fancy imme iately and the f st im
pression by r production But in the same ct we are aware of a state in which only th
first sound existed a d of another in which only its image existed in the fancy Such a con
scious ess as this is that f t m ... *of d as takes plac* (Wundt
... ion that the *persiste ce* and the
... go on simultaneously Also that
... *ch e a c* of a tim pe c ptio
and n *explanat on of the man er in which it com s abo t* [1] The Alt rnati e p 167

In short the practically cognized pre
with a certain breadth of its own on w
look in two direct ons into time The unit of compos
time is a *du ation* with a bow and a stern as it were—a rearward and a for
f h *duration block* that the relation of

ther
interval of time between but we seem to feel the interval
ith its two ends embedded in it. The experience is from the outset a synthetic datum not a simple one and to sensible perception its elements are inseparable although attention looking back may easily decompose the experience and distinguish its beginnin from its end

When we come to study the perception of Space we shall find it quite anal *ogous to time in this regard* Date in time corresponds to position in space and although we now mentally construct large paces by mentally imagining re moter and remoter positions just as we now construct great durations by men tally prolonging a series of successive dates yet the original experience of both pace and time is always of something already given as a unit inside of which attent on afterward discriminates parts in relation to each other Without the parts already given as *in* a time and *in* a pace subsequent discrimination of them could hardly do more than perce e them as *diffe ent* from each other it would have no motive for calling the difference temporal order in this instance and patial position in that.

And just as in certain experiences we may be conscious of an extensive space full of objects without locating each of them distinctly therein so when ma y impressions follow in excessively rapid succession in time although we may be dist nctly awa e that they occupy some duration and are not simultane- s we may be quite at a loss to tell wh ch comes first and wh ch last or we

der is yet of the fact of its occupancy of time we are never in doubt.

Lock in his d.m w y d n d th sense f d rat f m fl ct th cces. n f ur deas (Es y H ma L der t d g bk II, h xiv §) h p xv §) R d justly rema ks that if te ccess ve el m ts t mak d rati th m t mak d rati n, h rwise d ratio must be mad p f parts th t h duration, which is impossible. I ncl de th ref re th t th must be d n ry singl ten l l m t of Each th h le d tio is mad p th g ndeed is m re rtain than th t ry m tary part f d rati must h d tio as ry l m tary p rt f ext sio m st h ex si n, w t must be bserved that these l ments f d ti single inte als f su essive ideas, th re is essio f deas, y t w m st conce th m t h d r tio wh nc w may nclude w th ert int th t th pt f dur tio w her ther is no uc essi f id th mind (I t lle tual Pow say III, chap v) Q en k h point sa R C lla d in th F a m ts dded t J ff y transla ... [illegible]

The Sensible Present Has Duration

Let any one try I will not say to arrest but to notice or attend to the *present* moment of time One of the most baffling experiences occurs Where is it this present? It has melted in our grasp fled ere we could touch it gone in the instant of becoming As a poet quoted by Mr Hodgson says

Le moment où je parle est déjà loin de moi

and it is only as entering into the l
h
n
r
philosophic meditation Reflection
o the conclusion that it *must* exist but that it *does* exist can never be a fact of our immediate experience The only fact of our immediate experience is what Mr E R Clay has well called 'the *specious* present His words deserve to be quoted in full [1]

The relation of experie

ne datum refers is really a part of
as being a time that intervenes between
e specious present and let the past that is
obvious past All the notes of a bar of a
n the present All the changes of place of
eem to the beholder to be contained in the present At the instant of the termination of such series no part of the time measured h
Time then consider

—the past which does not exist
it does not exist and their conterminous the present the faculty from which it proceeds lies to us in the fiction of the specious present

---

it would exchan e one elem ther instead of graspin the whol suc end—are equally essential to the con ness together (Herbart *Psychol als*

Assume that similar pendulum strokes follow each other at regular intervals in a consciousness otherwise void When the first one is over n the fancy until the second st ation Thu doe The first second the end and the per moment of the se elements a and the first im the same act we are aware of a state in which only the first sound existed and of another in which only its image existed in the fancy Such consciousness as this is that of time *In it no succession of ideas takes place* (Wundt *Physiol Psych* 1st ed pp 681–2) Note here the assumption that the *persistence* and the *reproduction* of an impression are two processes which may go on simultaneously Also that Wundt's description is merely an *attempt to analyze the dura ce of a time perception* and no *explanation of the manner in which it comes about*

[1] The Alternative p 167

s ons

Wundt found that twelve impressions could be distinguished clearly as a united cluster provided they were caught in a certain rhythm by the mind and succeeded each other at intervals *not smaller than 0 3 and not larger than 0 5* of a second This makes the total time distinctly apprehended to be equal to *from 3 6 to 6 seconds*

Dietze[2] gives larger figures The most favorable intervals for clearly catching the strokes were when they came at from 0 3 second to 0 18 second apart *Forty* strokes might then be remembered as a whole and identified without error when repeated provided the mind grasped them in five sub groups of eight or in eight sub-groups of five strokes each When no grouping of the strokes be yond making *couples* of them by the attention was allowed—and practically it was found imposs ble not to group them in at least this simplest of all ways—16 was the largest number that could be clearly apprehended as a whole[1] This would make 40 times 0 3 second or 12 seconds to be the *maximum filled dura tion* of which we can be both *distinctly and immediately* aware

The maximum unfilled or *vacant duration* seems to lie within the same objective range. Estel and Mehner also working in Wundt s laboratory found it to vary from 5 or 6 to 12 seconds and perhaps more The differences seemed due to practice rather than to diosyncrasy

These figures may be roughly taken to stand for the most important part of what with Mr Clay we called a few pages back the *specious present* The spec ous present has in addit on a vaguely vanishing backward and forward fr e b t its nucleus is probably the dozen seconds or less that have just elapsed

If these are the maximum what then is the *m nimum* amount of duration which we can distinctly feel?

The smallest figure experimentally ascertained was by Exner who distinctly hea d the do bleness of two successive clicks of a Savart s wheel and of two

[1] *Ib d* II p 3
Ph l ph he Studie II p 36

—— [illegible]

latt case w eed nly be consc us *f th b ts f* mpty dur ti b tween th m in th f mer must perf rm pid acts f associati between th m and as many nam *f numbers.*

Estel in Wundt *Phil phi h Stud en* II, p 5 M h *bid* II, p 57 I D tz s periments even *mbers f str kes* re better ca ght than odd es, by th ea The *fidity f thetr q nc* had great infl ence th esult. At m e than 4 seco d p rt it was impossible to percei series f them as units t all (*f* W dt *Phys l P ych* II, p 4) They w re simply counted as so many indi dual trokes. B l w to o sec

Accuracy of Our Estimate of Short Durations

We must now proceed to an account of the *facts* of time-perception in detail as preliminary to our speculative conclusion Many of the facts are matters of patient experimentation others of common experience

First of all we note a marked *difference between the elementary sensations of duration and those of space* The former have a much narrower range the time sense may be called a myopic organ in comparison with the eye for example The eye sees rods acres even miles at a single glance and these totals it can afterward subdivide into an almost infinite number of distinctly identified parts The units of duration on the other hand which the time sense is able to take in at a single stroke are groups of a few seconds and within these units very few subdivisions—perhaps forty at most as we shall presently see—can be clearly discerned The durations we have practically most to deal with—minutes hours and days—have to be symbolically conceived and constructed by mental addition after the fashion of those extents of hundreds of miles and upward which in the field of space are beyond the range of most men s practical interests altogether To realize a quarter of a mile we need only look out of the window and *feel* its length by an act which though it may in part result from organized associations yet seems immediately performed To realize an hour we must count now!—now!—now!—now!— indefinitely Each now is the feeling of a separate *bit* of time and the exact sum of the bits never makes a very clear impression on our mind

How many bits can we clearly apprehend at once? Very few if they are long bits more if they are extremely short most if they come to us in compound groups each including smaller bits of its own

Hearing is the sense by which the subdivision of durations is most sharply made Almost all the experimental work on the time-sense has been done by means of strokes of sound How long a series of sounds then can we group in the mind so as not to confound it with a longer o a h

series of

sou y second

or third or fourth beat or we break the series in still more intricate ways Whenever we thus grasp the impressions in rhythmic form we can identify a longer string of them without confusion

Each variety of verse for example has its law and the recurrent stresses and sinkings make us feel with peculiar readiness the lack of a syllable or the presence of one too much Divers verses may again be bound together in the form of a stanza and we may then say of another stanza Its second verse differs by so much from that of the first stanza when but for the felt stanza form the two differing verses would have come to us too separately to be compared at all But these superposed systems of rhythm soon reach their limit In music as Wundt[1] says while the measure may easily contain 12 changes of intensity of sound (as in $^{12}_{8}$ time) the rhythmical group may embrace 6 measures and the period consist of 4 exceptionally of 5 [8?] groups

[1] *Physiol Psych* II pp 54 55

Wundt and his pupil Dietze have both tried to determine experimentally the *maximal extent of our immediate distinct consciousness for successive impressions*

Wundt found that twelve impressions could be distinguished clearly as a united cluster provided they were caught in a certain rhythm by the mind and succeeded each other at intervals not smaller than 0 3 and not larger than 0 5 of a second This makes the total time distinctly apprehended to be equal to from 3 6 to 6 seconds

Dietze gives larger figures The most favorable intervals for clearly catching the strokes were when they came at from 0 3 second to 0 18 second apart. *Forty* strokes might then be remembered as a whole and identified without error when repeated provided the mind grasped them in five sub-groups of eight or in eight sub-groups of five strokes each When no grouping of the strokes beyond making *couples* of them by the attention was allowed—and practically it was found impossible not to group them in at least this simplest of all ways—16 was the largest number that could be clearly apprehended as a whole This would make 40 times 0 3 second or 12 seconds to be the *maximum filled duration* of which we can be both *distinctly and immediately* aware

The maximum unfilled or *vacant duration* seems to lie within the same objective range Estel and Mehner also working in Wundt s laboratory found it to vary from 5 or 6 to 12 seconds and perhaps more The differences seemed due to practice rather than to idiosyncrasy

These figures may be roughly taken to stand for the most important part of what with Mr Clay we called a few pages back the *specious present* The specious present has in addition a vaguely vanishing backward and forward fringe but its nucleus is probably the dozen seconds or less that have just elapsed

If these are the maximum what then is the *minimum* amount of duration which we can distinctly feel?

The smallest figure experimentally ascertained was by Exner who distinctly heard the doubleness of two successive clicks of a Savart s wheel and of two

[1] *Ibid* II p 3

Phil phys h St die II, p 36

C t g was f rse t permitted It w ld h give symbolic c pt and o intuiti immediat percepti f th t tality f th series. W th unting w may of rse mpa t th serie f any l gth—se es whose beginnings h f d d f m o mind, d f hose t tality retain sensibl imp essi t II T count ries f licks is an alt th diff re t thing from m rely percei ing th m as di tin I th latt case w eed ly be nsci us f th b ts f mpty durati b tween them in th f me must pe f rm rapid cts f associati betwee th m and as many mes f numb rs.

Estel in Wundt *Phil phys k St die* II, p 5 M h *b d* II p 57 In Dietz periments ev mbers f trokes w re better ca ght than odd es, by th ea Th *pidu f their q* had gr t infl nc th es lt. At m tha 4 seco d part it was impossibl t percei series f th m as units t all (f Wundt *Physi l P y h* II, p 4) They w re simply unt d as m indi d l trokes. B l w t t sec ond, acc ding to th bserver j d m t gain becam nfused It w s f und th t th rate f ccessio most f ble f gra ping lo g seri was wh th t kes w sounded at intervals f f m 3 to 0. 8 part. Series f 4 6 8 6 were m re easily d tified than series f 0, 4 8. Th latter uld h dly be clearly grasped t all. Am g odd m bers, 3, 5 7 re the series easiest ca ght ext, 9 5 hardest f all 11 and 3 and 7 w impossible t pp hend.

successive snaps of an electric spark when their interval was made as small as about $\frac{1}{500}$ of a second[1]

With the eye perception is less delicate Two sparks m d o fall beside each other in rapid succe to be recog

- 044

u g impressions are only two in number we can easiest perceive the interval between them President Hall who experimented with a modified Savart s wheel, which gave clicks in varying n m ber and at varying intervals says[3]

u d

tions were so directed as to interval] required by each o remain constant through

another the pe e tends to be less certain and delicate and it makes a difference which impression comes first Thus Exner found[5] the smallest perceptible interval to be in seconds

From sight to touch	0 071
From touch to sight	0 053
From sight to hearing	0 16
From hearing to sight	0 06
From one ear to another	0 064

[1] The exact interval of the sparks was 0 00205 The doubleness of their snap was usually replaced by a s ngle se ming sound when it *fell to 0.00198* the sound becoming *louder* when the sparks seemed simultaneous The *d fference* between these two intervals is only $\frac{1}{100000}$ of a second and as E ner remarks our ear and brain must be w nderfully efici nt o gans to get distinct feelings from so slight an objective difference as this S e *Pfluger's A ch v* vol xi

[2] *Ib d* p 407 When the sparks fell so close together that their irrad ation-circles over lapped they appeared l ke *one sp k mov ng* from the position of the first to that of the second and they m ght then follow each other as close as 0.015 without the *d ection of the movement* cea ng to be clea When one park fell on the centre the other on the mar gin of the retina the time interval for successive app ehension had to be raised to 0.076

[3] Hall and Jastrow Studies of Rhythm in *Mind* xi p 58

[4] Nevertheless mult tudin us impressions may be felt as discontinuous though *separat d* by excessively minute intervals of time Grunhag n says (*Pfl ge A chiv* vi n at 10 000 electric shocks a second are felt h (*ib d* ii p ie fin er W P [1868] p 15) e ung r when 36.8 of them follow in a econd Simila 142) g ves ab ut 36 Lalanne (*C mpt* nger co tacts after 22 r petition in a rth On the reti a 20 to 30 impressi ns when they fall on the same spot The o the stimuli together into a musical t n when they follow t the r te of a little over 30 a second can st ll f el 132 of them a c nd as discortinu us when the take the shape of beats (Helmholtz *T mpfi l g* 3d d p o)

[5] *Pfl ger's A chiv* xi, p 418 Also in Hermann s *Hdbh d Phys ol* vol. 2 pt. 2 pp 60–62

To be conscious of a time interval at all is one thing to tell whether it be shorter or longer than another interval is a different thing A number of experimental data are on hand which give us a measure of the delicacy of this latter perception The problem is that of the *smallest difference between two times* which we can perceive

The difference is at its minimum when the times themselves are very short. Exner [1] reacting as rapidly as possible with his foot upon a signal seen by the eye (spark) noted all the reactions which seemed to him either slow or fast in the making He thought thus that deviations of about $\frac{1}{100}$ of a second either way from the average were correctly noticed by him at the time The average was here 0 1840 Hall and Jastrow listened to the intervals between the clicks of their apparatus Between two such equal intervals of 4 27 each a middle interval was included which might be made either shorter or lon er than the extremes After the series had been heard two or even three times no impression of the relative length of the middle interval would often exist and only after hearing the fourth and last [repetition of the series] would the judgment incline to the *plus* or *min s* side Inserting the var able between two invariable and like intervals greatly facil tated judgment which between two unlike terms is far less accurate Three observers in these experim t m d

cu as u ge as 0 355

This minimum absolute difference of course increases as the times compared grow long Attempts have been made to ascertain what *ratio* it bears to the t mes themselves According to Fechner s Psychophysic Law it ought al w ys to bear the same ratio Various observers however have found this not to be the case On the contrary very interesting *oscillations* in the accuracy of judgment and in the direction of the error—oscillations dependent upon the absolute amount of the times compared—h e bee ticed by all who have may be given *ted with there w ll be* nat is to say an interval which we judge with maximum accuracy a time which we tend to estimate as neither longer or shorter than it really is and away from which in both di

Pfl ger' A h VIII p. 6 T

37) th t, fter m h pract in mak g rap d t ns p sign l h timat d di 1 0 8 in 6 w th f .005 to .009 in w th f .00 and in 3 with f .003 *m nt d l P nst* [Mila 883] p ectly in figures his n ct tim o perim ts w th an rr f f m

M nd XI p 61 (886)

Mach *W ner St z b* LI, 2 p 33 (86) F p. 586 B r

M h *l t* nly laid by t his cas seem t *phus he St d*

rections errors increase their size[1] This time varies from one observer to another but its average is remarkably constant as the following table shows[2]

The times noted by the ear and the average indifference points (given in seconds) were, for—

Wundt[3]	0 72
Kollert[4]	0 75
Estel (probably)	0 75
Mehner	0 71
Stevens[5]	0 71
Mach[6]	0 35
Buccola (about)[7]	0.40

The odd thing about these figures is the recurrence they show in so many men of about three fourths of a second as the interval of time mo [illegible] to catch and reproduce Odder [illegible] [illegible]les of [illegible] er me [illegible] tain periodicity with the constant increment of 1 25 sec in his observations There would seem thus to exist something like a periodic or rhythmic sharpening of our time sense of which the period differs somewhat from one observer to the next

Our sense of time like other senses *seems subject to the law of contrast* It appeared pretty plainly in Estel s observations that an interval sounded shorter if a long one had immediately preceded it and longer when the opposite was the case

[1] Curious d screpancies exist between the German and the American observers with re pect to the *d ect on* of the error below and above the point of indifference—differences perhaps due to the *fat gue* involved in the American method The Germans lengthened intervals below it and shortened those above With seven Americans e perimented n by Stevens this was e actly reversed The German method was to passively listen to the intervals then judge the American was to reproduce them actively by mo ments of the hand In Mehner s experiments there was found a second indifference po nt at about 5 beyond which times were judged aga n too long Gl ss h se work on the subj ct is the latest (*Philo Stud en* iv p 423) found (when corrections were all [illegible] were estimated too short [illegible] 1 5 2 5 3 75 5 6 25 etc [illegible] corroborated Weber s law [illegible] m are printed interchangeably in Glass s art cle it is hard to follow

[2] W th Vierordt and his pupils the ind fference point lay as high as from 1 5" to 4 9 according to the observer (*cf D Ze t i n* 1868 p 112) In most of these experiments the time heard was actively reproduced after a short pause by movem nts of the hand which were recorded Wundt gives good reasons (*Phys ol P ycl* ii pp 289–90) f r rejecting Vierordt s figures as erroneous Vierordt s book it should be said is full of important matter nevertheless

[3] *Phys l Psych* ii pp 286 290

[4] *Philosophische Stud en* i p 86

[5] *M nd* xi p 400

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Like other senses too *our sense of time is sharpened by practice* Mehner ascribes almost all the discrepancies between other observers and himself to this cause alone.

T acts of t me filled (with clicks of sound) *seem lon er than vacant ones* of the same duration when the latter does not exceed a second or two This which reminds one of what happens with spaces seen by the eye becomes reversed when longer times are taken It is perhaps in accordance with this law that a *loud sound* limiting a short interval of time makes it appear longer a *sl ght* sound shorter In comparin intervals marked out by sounds we must take care to keep the sounds uniform.

There is a certain emotional *feeling* accompanyin the intervals of time as is well known in music *The sense of haste goes with one measure of rapidity that of delay with ano* d h e two feelings harmonize with different mental moods Vierordt
at rates varying from
fell into seven categories
feelin included the intervals following each other within a certain range of peed and no others This is a qualitative not a quantitative judgment—an æsthetic judgment in fact The middle category of peed that was neutral or as he calls it adequate contained intervals that were grouped about 0 62 second and Vierordt says that this made what one might almost call an *agreeable* time

The feeling of time and accent in music, of rhythm is quite independent of that of melody Tunes w th marked rhythm can be readily recognized when simply drummed on the table with the finger tips

We Have No Sense for Empty Time

Although subdividing the time by beats of sensation aids our accurate knowledge of the amount of it that elapses such subdivision does not seem at the first glance essential to our percepti n of its flow Let one sit with closed eyes and abstra
time
of the
circumstances as these no variety in the material content of our thought and what we otice appears if anything to be the pure series of durations buddin as it were and growing beneath our indrawn gaze Is this really so or not? The question is important for if the experience be what it roughly seems we have a sort of special sense for pure time—a sense to wh ch empty duration is an adequate stimulus while if t be an illusion it must be that our perception of time s fl ght in the experiences quoted is due to the *fill g* of the time and to

Cf especially pp. 558–6
Wundt *Physiol P ych* II, p 87 Hall and Jastr w in *Mind* XI, p 62
M hne *lo cit* p. 553.
The umber f distinguishabl *differ ce* f speed between these limits is, as h takes care t mark, ry much larg than 7 (*Der Zeits* p. 37)
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q o eq is due to the *filling* of the t me and to

Cf especially pp. 558–61

Wundt *Phy l P s h* ii, p 87 H ll d Jast w *M d* xi p 62

M hn *lo cit* p 553

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car t m k ry m ch la g than 7 (*Der Z itsi* p 37)

dt, *p cit* pt 9 § 8 p 2

people will think they directly perceive the length of the past fortnight to exceed that of the past week But there is properly no comparative time *intuition* in these cases at all It is but dates and events *representing* time their abundance *symbolizing* its length I am sure that this is so even where the times compared are no more than an hour or so in length It is the same with Spaces of many miles which we always compare with each other by the numbers which measure them [1]

From this we pass naturally to speak of certain familiar variations in our estimation of lengths of time *In general a time filled with varied and interesting experiences seems short in passing but long as we look back On the other hand a tract of time empty of experiences seems long in passing but in retrospect short* A week of travel and sight seeing may subtend an angle more like three weeks in the memory and a month of sickness hardly yields more memories than a day The length in retrospect depends obviously on the multitudinousness of the memories which the time affords Many objects events changes many subdivisions, immediately widen the view as we look back Emptiness monotony familiarity make it shrivel up In Von Holtei s *Vagabonds* one Anton is described as revisiting his native village

[1] The only objections to this which I can think of are (1) The accuracy with which some men judge of the hour of day or night without looking at the clock (2) the faculty some h f l r t n appointed hour (3) the accuracy of time percept on reported to

sign of how much time has sped and so lead us to infer the hour That there are s ch processes it is hardly poss ble to doubt

An ingen ous friend of mine was lo r urrl d to know why each day of the week had such a characteristic physiognomy to him cessation of the city s rumbling and Monday to come from the clothes ceil ng of Tuesday to a cause which Wednesd y

Probably eac it as closely as ever that the tery not as yet cleared up All my life I have been struck by the accuracy w wake at the same *exact* *nute* n ght after night and morning after morning if only the Th r nistrat on in me is independent of sl p Aft r l ng

the time measuri g faculty in a marked degree I have an int of an idiot girl wh ch says She was punctual almost to a minute in her dem nd for fo d h h attent ons Her dinner w s g ne lly furnished her at 12 30 P M and at

made k own h r ants promptly at 12 n Any sug demanded on the next at the corres on Wednesday at the same hour on fruit were not given her she c nt nu f ur on Friday the process ould b repe ted but would last less long a d so on for two or three days If one of her sisters isited her accident lly at a certain h ur the sharp p ercing scream w m n her at th same hour the ne t d y etc. etc — F r these obscure m u Prel *The Philosophy of Myst c sm* chap 111 § 1

Seven yea s [he exclaims] seven years since I ran away! More like seventy it seems so m ch has happe ed I cannot think of it all w thout becoming dizzy—at any rate n t no And yet again when I look at the village at the church tower it seems as if I could hardly have been se en days away

Prof Lazarus (from whom I borrow this quotation) thus explains both of these contrasted illusions by our principle of the awakened memories being multitudinous or few

ariety wh ch he had in v w
ind as ts image lies befo e
on not in chr nolog c o der
or f om hro logic moti es but sugge ti g each othe by all so ts f c nnections—rise ma e m ges of all his r ch gab ndage a d ro r l f They oll and v ave
from the sixth soon
ns s if seventy years
n Then the inne
eye turns way fr m all th s past The ut r o e turns to the village pe ally to the hu ch tower The s ght of it lls h l h ld

The same space of time seems sho ter as we grow olde —that is the days the months and the years do so whether the hours do so is doubtful and the minutes and seconds to all appearance remain about the same

Whoever c unt m ny lust a in h s memo y eed only q estion him elf to find that the last of these the past fi e years h ped much mo e quickly than the preced g pe ods f eq al amount Let a y o e emembe r hi last e ght or ten sch ol years it is the sp ce of a c ntury Compa e w th them the last eight o ten years of life it s the pace of an ho

So wr tes I rof Paul Janet and gives a solution which can hardly be said to d minish the mystery There is a l w ys by which the apparent len th is proportional to the total length $\frac{1}{10}$ of his whole life—a man of 50 y preserv ng a constant len th This rmula rou hly expresses the ph m

glancing view In
or objective every
and our recollec
eresting travel are
multitudinous and long drawn out But as each passing year converts some of this experie c
itine which we hardly
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e in *retrospect* They
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ue I z (8 8) p 9 (Essay Zeit d W ile)
Revue philo phique vol. iii, p 496

people will think they directly perceive the length of the past fortnight to exceed that of the past week But there is properly no comparative time *intuition* in these cases at all It is but dates and events *representing* time their abundance *symbolizing* its length I am sure that this is so even where the times compared are no more than an hour or so in length It is the same with Spaces of many miles which we always compare with each other by the numbers which measure them [1]

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Probably each hour in the day has for most of us some outer r inne n associ ted ith it as closely as these s gns with the days of the week It mu t be dmitt d after all how ever that the great improvement of the time perception du ing sleep and tranc is a m s tery not as yet cleared up All m k by the accuracy ith which I ll morning after morning if only the is independent of sl ep Aft h ng g the t m and f r days and w cks at an identical minute by the cl ck as if m inward phys l cal process cau ed the act by punctually runn ng d vn—Id t are said om times to possess the time measu ing faculty in a marked degree I h ve an int rest ng manuscript c unt of an idiot girl which says She was punctual alm st to a minut in he demand for food and other regular attentions Her dinne was gen rally furnish d he at 1 30 P M and at that hour she w uld begin to scream if it were n t forthc m ng If n Fa t-day or Th nks giving it were delayed in accord nce with the New England cu tom she scre med f om h usual dinner hour until the food was carried to her On th n xt day how r sh g n made kno vn b r vants n m sh wn h r n ne day was e gi n her 1 4 P M her expectati n and if th or two r three hours At ong and so on for t o r is ea he accid ntally at a e tain ho the sharp p er in scream was sure to summon her at the same h u the n xt day tc etc—F r these b scure matters consult C Du Prel *The Philo ophy of Mysticism* ch p III § 1

some deeper cause *may* be at work This cause can only be ascertained if it exist by finding out *why we perceive time at all* To this inquiry let us though without much hope proceed

The Feeling of Past Time Is a Present Feeling

If asked why we perceive the light of the sun or the sound of an explosion we reply Because certain outer forces ether waves or air waves smite upon the brain awakening therein changes to which the conscious perceptions light and sound respond But we hasten to add that neither light nor sound *copy* or mirror the ether or air waves they represent them only symbolically The *only* case says Helmholtz in which such copying occurs and in which

our perceptions can truly co espond with outer eality is that f the *tim succession* of phenomena Simultane ty succe n and the regular return of simulta eity or suc ession can obtain as well in sensations as n o ter events E ents like o per ceptions of them tak place in time so that the time relations f the latter c n furnish a true c py of those f the former The sensation of the thunder follows the ensa tio of the lightning just as the so o ous co ulsing of the ai by the electric dis charge eaches the observe s pl ce later than that of the luminiferous ether

One experiences an almost instinctive impulse in pursuing such reflections as these to follow them to a sort of crude speculative conclusion and to think that he has at last got the mystery of cogn tion where to use a vulgar phrase the wool is short What more natural we say than that the sequences and durat ons of things *should* become known? The succession of the outer forces

The brain s successive chan es ve pulses of the mental stream time relations of its own states ions so must it know them too se their own cognition or in changes out of the mind which

se why time is perceived by the mind

This philosophy is unfortunately too crude Even though we *were* to con ceive the outer successions as forces stamping their image on the brain and the brain s successions as forces stamping their image on the mind still between the mind s own changes *be g* successive and *knowing the r own succession* l es as broad a chasm as between the object and subject of any case of cogni tion in the world *A succession f f*

I have shown at the outset of the article that what is past to be known as past must be known *w th* what is present and *during* the present spot of time As the clear understanding of this po nt has some importance let me at

[1] Physiol Optik p. 445

[2] Succession, time *per se* is f rc Our talk bo t its dev ring t th t is ll lip tical Its *ont nt* are bat dev ur The law f inertia is incomp tibl w th time being assumed as an efficient cause f anything.

to note the actual time its If A ... to de- ... om ... nt ... ative emptiness of content of a tract of time we grow attentive to the passage of the time itself—expecting and being ready for a new impression to succeed when it fails to come we get an empty time instead of it and such experiences ceaselessly renewed make us most formidably aware of the ext... e your eyes and ... The full length ... into it ... ls as ... interminable ... rself ... ll ... e

... ity for *stimula* ... and the feeling ... ating experience we can have[2] The sensation of tædium is a *protest* says Volkmann against the entire present

Exactly parallel variations occur in our consciousness of space A road we walk back over hoping to find at each step an object we have dropped seems to us longer than when we walked over it the other way A space we measure by pacing appears longer than one we traverse with no thought of its length And in general an amount of space attended to in itself leaves with us more impression of spaciousness than one of which we only note the content[3]

I do not say that e erything in these fluctuations of estimate can be accounted for by the time s content being crowded and interesting or simple and tame Both in the shortening of time by old age and in its length ...

[1] Empty tim ... top at ... per ... e example let in ... re for instance in which a tangle of melodies ... e un ler way—suddenly a single voice be heard which sustains a lon note while all el is hushed This one note w ll app ar very p otracted—why? B cau e we *exp t* to h a c or panying it the notes of the other instruments but they fail to come (Herbart *Psychol als* W § 115) Compare also Munsterbe *B i ge* No 2 p 41

[2] A night of pain w ll seem terribly long we keep looking f rward t a m m nt which never comes—the moment wh n it h ... s expe i nc is n t ... rom its mpu s ... ory of th n ght ... ys (*p cit* p 202) is the l ng time of the suff ing n t the suffering of the l ng time *pe se*

[3] On these variat ons of time estimate *cf* Romanes Con ci usness of T me in *M nd* vol III p 297 J Sully *Illus ons* pp 245–61 302–305 W Wundt *Phys l P ych* II, pp 287–88 bes d s the ssays qu t d from La a us nd J n t In G rma th successors of Herbart have treat d of this subj ct *cf* Volkmann *Lek bu h d Psych* § 89 nd f references to other authors his n te 3 t this secti n Lindn r (*Lbh d empir P y h*) as a parall l effect instances Alex d r th Great s life (th ty three y ars) which seems to us as if it must be lon because it was so eventful S milarly the E lish Comm n lth etc.

its forward end as fast as they fade out of its rearward one and each of them changin its time-coefficient from not yet, or not quite yet, to just gone or gone as it passes by Meanwhile the pecious present the intuited dura tion, stands permanent, like the rainbow on the waterfall with its own quality unchanged by the events that stream through it Each of these as it slips out retains the power of bein reproduced and when reproduced is reproduced with the duration and neighbors which it ori inally had Please observe how ever that the reprod f an event, *after* it has once completely dropped out of the rearward (e el different psychic fact from its direct past A creature mig the time-sense but the latter would ... immediately passin by Time older than that he would ne er recall ... reproduction in the text because I am speakin of human beings who notori ously possess it Thus memory gets strewn with *dated* things—dated in the sense of being before or after each other The date of a thing is a mere relation of *before* or *after* the present thing or some past or future thing Some things we date simply by mentally tossin them into the past or future *direction* So in space we think of En land as simply to the eastward of Charleston as lying south But again, we may date an event exactly by fitting it between two terms of a past or future series explicitly concei ed just as we may accurately think of England or Charleston bein just so many miles away

The things and events thus vaguely or exactly dated become thenceforward those signs and symbols of lon er time-spaces of which we previously spoke According as we think of a multitude of them or of few so we imagine the time they ep esent to be long or short. But *the orig nal paragon and prototype of all c nceived t mes is the specious present the short duration of wh ch we are m mediately and ncessantly sensible*

To What Cerebral Process Is the Sense of Time Due?

Now to what element n the b ain process may this sensibility be due? It cannot as we ha e seen, be due to the mere duration itself of the process it

N more and not et are th proper time feelings, and we are ware f time in n ther way than through these feelings, says Volkmann (*P ychol.*, § 8) This, which is n t strictly true f ur feeling of *tim per se* as an elementary but f duration, is true of ur feeling f da in is events.

W construct the miles just as we construct the years. Travelling in the cars makes successio f different fields f view pass bef re ur eyes. When those that have passed f m present sight re in memory they maintain their m tual order because their con tents verlap W think them as ha ing been bef re behind each ther and, from th multitude of the views w can recall behind th on now presented, w comp te the total space have passed through.

I ten said that th perception of time develops later than that f space, because chil dren ha e so vague an idea f all dates before yesterday and after to-morr w but vaguer th her h f ext ns ns that exceed as greatly their unit f space intuiti n. Recently I week th coun

try, the distance being three miles.

the risk of repetition, recur to it again Volkmann has expressed the matter admirably, as follows

One might be tempted to answer the question of the origin of the time idea by simply pointing to the train of ideas whose various members starting from the first successively attain to full clearness But against this it must be objected that the successive ideas are not yet the idea of succession because succession *in* thought is not the thought *of* succession If idea A follows idea B consciousness simply exchanges one for another That B *comes after* A is for our consciousness a non existent fact for this *after* is given neither in B nor in A and no third idea has been supposed The thinking of the sequence of B upon A is another kind of thinking from that which brought forth A and then brought forth B and this first kind of thinking is absent so long as merely the thinking of A and the think[illegible] In short when we look at the m[illegible] and [illegible] r the other we must *think* them both

If we represent the actual time stream of our thinking by an horizontal line the thought *of* the stream [illegible] of its length past present or to [illegible] ed upon the horizontal at a cer[illegible] [illegible] stands for a certain object or con[illegible] which in this case is the time thought of and all of which is thought of together at the actual moment of the stream upon which the [illegible]ndicular is raised Mr James Ward [illegible] ticle Psy[illegible] He says

[illegible] represent succession as a line represent simultaneity as a second line at right angles to the first empty time—or time length [illegible] we may say—is a mere abst[illegible] [illegible] or distance we are confined to lines [illegible] at right angles to the actual line of depth In a succession of events say of sense impressions A B C D E the presence of B means the absence of A and C but the presentation of this succession involves the simultaneous presence in some mode or other of two or more of the presentations A B C D In reality past present and future are differences in time but in presentation all that corresponds to these differences is in consciousness simultaneously

There is thus a sort of *perspective projection* of past objects upon present consciousness similar to that of wide landscapes upon a camera screen

And since we saw a while [illegible] stinct *intuition* of dura[illegible] r maximum vague intui[illegible] we must suppose that [illegible] *duration is pictured fairly steadily in each passing instant of consciousness* by virtue of some fairly constant feature in the brain process to which the consciousness is tied *This feature of the brain process whatever it be must be the cause of our perceiving the fact of time at all*[2] The duration thus steadily perceived is hardly more than the specious present as it was called a few pages back Its *content* is in a constant flux events dawning into

[1] *Lehrbuch d Psych* § 87 *Cf* also H. Lotze *Metaphysik* § 154

[2] The cause of the percei[illegible] n[illegible] t th[illegible] object perceived!

briefly the only conclusion which seems to emerge from a study of them and of the facts—unripe though that conclusion be

The phenomena of summation of stimuli in the nervous system prove that each stimulus leaves some latent activity behind it which only gradually passes away (See above pp 53–56) Psychological proof of the same fact is afforded by those after images which we perceive when a sensorial stimulus is gone We may read off peculiarities in an after image left by an object on the eye which we failed to note in the original We may hark back and take in the meaning of a sound several seconds after it has ceased Delay for a minute however and the echo itself of the clock or the question is mute present sensations have banished it beyond recall With the feeling of the present thing there must at all times mingle the fading echo of all those other things which the previous few seconds have supplied Or to state it in neural terms *there is at every mo-*

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ciati f mpar ti e distance in tim as w ha are t th p esent, wh re these per pti ffects consid bl Lock pe ks f ur dea cceeding each th t tain distances t m ch unlik th images in the nsid f la tern turned und by the heat f candl and guesses th t this ppearance f their in train ries t v ry m ch in waking man. *h w what is this d t e' th t par t s f m b b f m and so* and what means ha w f kn wing that t is t l rably constant in w king lif ? *It is pr b bly th t th esid m f which I hav called t mp al sig or in th word it is th mov ment f ttent f m t b*

Nevertheless, M Ward does t call ur feeling of this m ment f ttenti the *origi l f f ling f tim* ts b ain p ess th brain p cess hich directly causes us to percei tim H says, m m t later that "th gh th fixati f tt ti d es f se really occupy time it is probably t in th first instance percei ed as time—i.e as ti us 'pr tensity' to use term f H milt s—but as int nsity Thus, if this uppositi be true ther is an element in ur ncr t tim pe cepti ns which has place in b tr ct cepti f Time In Tim physically co cei ed ther is trac f int nsity in time psychically experienced, durati is p imarily an int nsi e magnit de, and so far l terally pe cepti

Its riginal is then, f I und rstand M Ward, som thin like *f li g* which c m panies, as pleasure and pain may accompany th m m ts f ttenti n. Its b ain p cess m t, t w uld seem, be assimilated in general type t th b

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set no is kep all but tati nary by th epeated p ese tati f th sam imp es S h cess d defect f surprises make realiz f ct which in ordinary lif is so b scur as t escape tice. B t recent experim ts ha t thus f t in m e striking light and made clear wh t Locke h d dimly bef his mind in talki g f rtain distance b t ee the p esentati ns f aking man. I est m

f se certain r tim f expe says n en ar th rati w d

—interval f abo t three f urths f second, which is estimated

must be due to an element present at every moment of the process and this element must bear the same inscrutable *sort* of relation to its correlative feeling which all other elements of neural activity bear to their psychic products be the latter what they may Several suggestions have been made as to what the element is in the case of time Treating of them in a note [1] I will try to express

[1] Most of these explanations simply give the sig s which adhering to impressions lead us to *date* them within a duration or in other words to assign to them their order Why it should be a *t me* order however is not explained Herbart s would be explanation is a simple description of time perception He says it comes when with the last member of a series present to our con ciousness we also think of the first and then the whole series revives in our thought at once but with strength dimini hing in the *backward* direction (*Psychol als Wiss* § 115 *Lehrb ur Psychol* §§ 171 172 175) Sim larly Drob sch who adds that the series must appear as one already *elapsed* (*durchlaufene*) a word which shows even more clearly the question begging nature of this sort of account (*E pi sche Psychol* § 59) Th Waitz is guilty of similar question begging when he explains our time conscious essful attempts to make our percepts agree with our Volkmann s mythological account of past repre out of the seat of consciousness being driven *back* by them etc suffers from the same fallacy (*Psychol* § 87) But all uch accounts agree in implying one fact—viz that the brain processes of various events must be active simultaneously and in varying strength for a time perceptr n t l n

a time order is entirely inexpl cable (p 591) M Guyau s account (*Revue philosoph q e* XIX p 353) hardly differs from that of his p edecessors except in picturesqueness of style Every change leaves a eries of *t ai ées lu euses* in the mind like the pass ge of sl oot ng stars Each image is in a more fading phase cco ding as its original was mor rem te This group of images give dur t on the mere time form the b d of time Tl e distinction f past present and future within the bed comes from our active nature The future (as with Waitz) is v hat I v ant but have not yet got and must wait for All this is doubtless true but is no *explanat on*

Mr Ward gives in his *Encyclopæd a B tannica* article (Psychology p 65 col 1) a till more refined attempt to pecify the temporal sign The problem being among a number of other things thought s successive but s multaneou ly thought to determine wl h is first and which last he says After each distinct representation *a b c d* there may interv ne the representati n f that *moven ent of atte t on* of which e are aware in passing from one object to another In our pre ent reminiscence we h ve it must be allowed l ttle dir ct proof of this intervention though there is I think indirect ev dence of it in the tend cy of the flow of ideas to follow the order in wh ch the presentations v ere t f rst attended to With the movement itself whe the direct on of attention changes we are f miliar n ugh though the res dua of such movements are not o din r ly con p cuous Th e re id then are o r temporal gn But temporal s gns alone will not furni h ll the pic to l e act ess of th t me per pective These giv us only a fixed s ries but the l w of obliviscence by insuring a progr ssive variation in i tensity as we pass from o e member of the series to the other y elds the effect which we call time-d t nce. By them elves s cl variations in inten ty w ld leave us liable to co fo d more ivi l r p s ntations in the di tance with fainter on s nea er the pre nt but fr m this mistake the tempor l igns save us wher the memory conti uum is impe fect such mist kes continu lly occur On the other hand wl e e these ati ns are sl ght and imperceptible th gh tl e memory cont nuum preserves the order of e nts intact we have still no such distinct appre

briefly the only conclusion which seems to emerge from a study of them and of the facts—unripe thou h that conclusion be

The phenomena of summation of stimuli in the nervous system prove that each stimulus leaves some latent activity behind it which only gradually passes away (See above pp 53–56) Psychological proof of the same fact is afforded by tho e *after images* which we perceive when a sensorial stimulus is gone We may read off peculiarities in an after image left by an object on the eye which we failed to note in the original We may hark back and take in the meaning of a sound several seconds after it has ceased Delay for a minute how ever and the echo itself of the clock or the question is mute present sensations have banished it beyond recall With the feeling of the present thing there must at all times mingle the fading echo of all those other things which the previous fe nnlied Or to state it in neural terms *there is at every mo*

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Neverth l ss, M W rd does t cau

I I r f eling f tim its b ain p ess th b ai p cess which dir ctly causes us perce tim H says, a m ment later that th gh th fixati f ttenti d es f rse really occupy tim t is prob bly t th first instan percei ed as time—i as tt us pr tensity to use t rm f Hamilt s—b t as intensity Thus, if this pp sit be tru th is an lem t in cret tim p rcepti ns which has o place in b tract co ceptio f Time In Tim physically cei ed th re is n trace f intensity time psychically experien ed, d rati n is p imarily an intensi e m gnitud and so far i t rall

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t ee th p ese tati ns f waking man In estim ting ry sh pe as se nd less, indicated say by th be ts f metr m t is f und th t th ce tain pe od f which th mean f umber f timates is rr ct whil sh rt peri ds th b le and lo g periods und -estimated I t ke this t b ev d of th time occupied in cc mmodating o fixing tt tio All d g t th f ct that se f expe ne es, b d m m h t et nect, wh ch emed everlasting in passing h say Wha tells in

ing t t t te

rad m. And

rras i mat ly po quasi m

no directly experie ce as d rati t all.

Wundt also thinks that th interval f abo t three f urths of a seco d, which is estim ted

ment a cumulation of brain processes overlapping each other of which the fainter ones are the dying phases of processes which but shortly previous were active in a maximal degree The AMOUNT OF THE OVERLAPPING *determines the feeling of the* DURATION OCCUPIED WHAT EVENT *ar to occupy the duration depends rocesses are* We know so little of y that even where a sensation monoto y endures we cannot say that the earlier moments of it do not leave fading processes behind which coexist with those of the present moment *Duration and events together form our intuition of the specious present with its content* [1] *Why* such an intuition should result from such a combination of brain processes I do not pretend to say All I aim at is to state the most *elemental* form of the psycho physical conjunction

I have assumed that the brain processes are sensational of active attention (see ve a in a moment speak Meanwhile still

with the minimum of error points to a connection between the time feeling and the succession of distinctly apperceived objects before the mind The association time is also equal to about three fourths of a second This association time he regards as a sort of internal standard of duration to which we involuntarily assimilate all intervals which we try to reproduce bringing short nger ones down [In the Stevens result we for the longer intervals there seem longer ough he adds (*Physiol Psych* II p 286) ing according to the Webers our legs per swing It seems thus not unlikely that both psychical constants that of the average peed of reproduction and that of the surest estimation of time have formed themselves under the influence of those most habitual movements of the body which we try to subdivide rhythm call

distinguish in memory the first stroke of the from the second unless to each there clove its special time sensation which existed with it?—he says It is probable that this feeling is connected with that organic *consumption* which is necessarily linked with the production of consciousness and that the time which we feel is probably due to the [mechanical?] *work of* [the process of?] *attention* When attention is strained time seems long during easy occupation short etc The fatigue of the organ of consciousness as long as we wake continually increases and the work of attention augments as continually Those impressions which are conjoined with a *greater amount* of work of at *later* The apparent relative di ich onisms of dreams are held by ne attention between t bject mpfi d gen (103 ff) d to say now wheth r h ory advanced i mv wn but only an lem ntary makes us aware f time

[1] It would be rash to say definitely just how m ny conds long this pecious present must needs be for processes f de asymptotically nd the distinctly intuit d present merges into a penumbra of mere dim ecency before t turns int the past which is imply od d and conceived M ny a thi g whi h e d a pla pen d ed by phase in spite of the long interval

speaking of sensational processes
light on the account I give As is h
every act of perception of a sensorial ———
two different stimuli—e g a si ht and a sound—are given at once or nearly at once we have difficulty in attending to both and may wrongly jud e their interval or even invert their order Now as the result of his experiments on such stimuli Wundt lays down this law that of the three possible determinations we may make of their order—

namely simultane ty co and disco tinuous t ans tion—only the first and la t a e realized imp ess ns as simultaneo wh h ems t c rr por tter F r ur tten which will then c mpose be so adapted to one eve se d event can be percei ed only after certain time attent on eaches its eff cti e maximum for t and dimini hes for th first event. In this ca th ents e percei ed as *t.e* and in uc essi e order—that is as separated by a time interval in whi h attenti n is ot suffic ently accommodated to either t bring a di ti ct perceptio abo t While we are hurrying from ne to the other everything between them vanishes in the twilight of general consci usness.

One might call this the *law of disconti uous succession n time of percepts to h ch e ca not easily at end at once* Each percept then requires a separate

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Phy ol P y h ii. p 63

I lea my t t as t as printed bef M nst berg essay ppe d (bo pag 406 note) H denies that w measure any b t minimal durations by th amount of fading in the deati nal p ocesses, and talks alm t exclusi ly f feelings f muscul ten o in his t h as I h mad m ti f such things in mi I nn t h w er see th t th any fact betw en wh t h nd I g est. I m mainly erned with the conscı usness f durati regarded as pecifi t f bject h is co cerned w th this bject me m t exclusi ely Feelings f tensi might be th m ans f th m as remen hilst lapping p ocesses f y d ery kind g th bj ct t be measured Th cc mmodati and espirat ry m ments f m which th feelings f tensi come f rm regularl ecurring sens ti ns di ded by their phases int intervals as d finit as those b hi h dstick is di ded by th ma ks po ts l th

Let a^2 be h mol gous phases in f cessi e m ments f this kind. If f ur te stimuli 3 4. incid ch w th f these u cessi phases, then thei distanc part ar felt as q al th rwise t. B t th is reaso whateve t ppose tha h me erlapping f th b ain p oc ss f by th f din p es f that f 3 by hat f t does t gi th *haracteristic q ality f t* which w *call* distan e

claim t f them. H takes ur as f tim f grant d, and nly discusses ts meas rement.

such an overlapping of brain processes of different phase—wherever and from whatever cause it may occur

To pass now to conceptual processes Suppose I think of the Creation then of the Christian era then of the battle of Waterloo all within a few seconds These matters have their dates far outside the specious present The processes by which I think them however all overlap What events then does the specious present seem to contain? Simply my successive *acts of thinking* these long past things not the long past things themselves As the instantly present thought may be of a long past thing so the just past thought may be of another long past thing When a long past event is reproduced in memory and conceived with its date the reproduction and conceiving traverse the specious present The immediate content of the latter is thus all my *direct experiences* whether subjective or objective Some of these meanwhile may be *representative* of other experiences indefinitely remote

The number of these direct experiences which the specious present and immediately intuited past may embrace measures the extent of our primary as Exner calls it or, as Richet calls it of our elementary memory [1] The sensation resultant from the overlapping is that of the duration which the experiences seem to fill As is the number of any larger set of events to th[illegible] experiences so we suppose [illegible]

[illegible] time may possibly be explained by alterations in the rate of fading in the images producing changes in the complication of superposed processes to which changes changed states of consciousness may correspond But however *long we may conceive* a space of time to be the objective amount of it which is *directly perceived* at any one moment by us can never exceed the scope of our primary memory at the moment [illegible] tion [2]

in [illegible] tively feel and in the fineness of the events that may fill it Von Bær has indulged[3] in some interesting computations of the effect of such differences in changing the aspect of Nature Suppose we were able within the length of a second to note 10 000 events distinctly instead of barely 10 as now if our life were then destined to hold the same number of impressions it might be 1000 times as short We should live less than a month and personally know nothing of the change of seasons If born in winter we should believe in summer as we now believe in the heats of the Carboniferous era The motions of organic beings would be so slow to our senses as to be inferred not seen The sun would stand still in the sky the moon be almost free from change and so on But now reverse the hypothesis and suppose a being to get only one 1000th part of the sensations that we get in a given time and consequently to live 1000 times as long Winters and sum

[illegible]

[1] [illegible] in giving the feeling of duration to the specious present.

[3] *Reden* (St Petersburg 1864) vol 1 pp 255–68

mers will be to him like quarters ...
ing plants will shoot into being so ...
annual shrubs will rise and fall ...
springs the motions of animals w...
of bullets and cannon balls the sun will scour through the sky like a meteor leavin a fiery trail behind him etc That such imaginary cases (barring the superhuman longevity) may be realized somewhere in the animal kingdom it would be rash to deny

A gnat s win s [says Mr Spencer] make ten or fifteen thousand strokes a second. Each stroke implies epa ate nervous act on Each such nervo s acti n or change in a ervous centre s probably as pp eciable by the gnat as is a q i k mo ement of his rm by man. And if this or anything like th s is the fact, then the tim occupied by a gi en external change measur d by many movements in the o e case mu t seem m ch longer than in the other case when mea ured by one movement

In hashish intoxication there is a curious increase in the apparent time perspective We utter a sentence and ere the end is reached the beginning seems *already to date from indefinitely lon a o* We enter a short street and it is as if we should never get to the end of it This alteration might conceivably result from an approach to the condition of Von Bær's and Spencer s short lived beings If our discrimination of successions became finer grained so that we noted ten stages in a process where previously we only noted one and if at the same time the processes faded ten times as fast as before we might have a specious present of the same subjective len^th as now giving us the same time-feeling

to the enlargement of space by a microscope fewer real thin s at once in the immediate f eld of v ew but each of them taking up more than its normal room and makin the excluded ones seem unnaturally far away

U der other conditions processes eem to fade rapidly w thout the compensating increase in the subdi is b l ty of successions Here the apparent length f the specious present contracts Consciousness dwindles to a point and loses all ntuiti e sense of the whence and whither of its path Express acts of memory eplace r p d bi d s-eye views. In my own case something like this occurs in extreme fatigue Long illnesses produce it Occas onally it appears to accompany aphasia It would be vain to seek to imagine the exact brain change in any

P ych l gy § 9

Th patient ca t tain the imag f bject m re than m ment. His m m ry

p into his hand so that he can sim ltane usly t ch t w th se eral fing rs, h names t

of these cases But we must admit the possibility that to some extent the variations of time estimate between youth and age and excitement and *ennui* are due to such causes more immediately than the one we assigned some time ago

But whether our feeling of the time which immediately past[1] *events have filled be of something long or of something short it is not what it is because those events are past* but *because they have left behind them processes which are present To those processes however caused the mind would still respond by feeling a specious present with one part of it just vanishing or vanished into the past* As the Creator is supposed to have made Adam with a navel—sign of a birth which never occurred—so He might instantaneously make a man with a brain in which were processes just like the fading ones of an ordinary brain The first real stimulus after creation would set up a process additional to these The processes would overlap and the new created man would unquestionably have the feeling at the very primal instant of his life of having been in existence already some little space of time

Let me sum up now by saying that we are constantly conscious of a certain duration—the specious present—varying in length from a few seconds to probably not more than a minute and that this duration (with its content perceived as having one part earlier and the other part later) is the original intuition of time Longer times are conceived by adding shorter ones by dividing portions of this vaguely bounded unit and are habitually thought by us symbolically Kant s notion of an *intuition* of objective time as an infinite necessary continuum has nothing to support it The *cause* of the intuition which we really have cannot be the *duration* of our brain processes or our mental changes That duration is rather the *object* of the intuition which being realized at every moment of such duration must be due to a permanently present cause This cause—probably the simultaneous presence of brain processes of different phase—fluctuates and hence a certain range of variation in the amount of the intuition and in its subdivisibility accrues

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it without diff cult) Th s patient has thus lost the capacity for group ng successive im pressions into a whole and perceiving them as a whole (Cr hes ı A ck (Pt

seconds apart and yet it always seems to me as if between the ea l er and the later one a long interval has passed away I conjectu ally account for the phenomenon thus c lling the two stages of the act *a* and *b* respectiv ly Were I aw ke *a* would le e a fadi g process in my sensorium which would o erlap the process of *b* wh n the latter came and b th would then appear in the same pecious present bel ng g to its earl er end B t the sudden advent f the brain-change call d sleep extinguishes *a* s fading pr cess abruptly When *b* th n c mes and wakes me *a* comes back it is true but not as belonging to the pecious present It has to be pec lly *rev ked* memory This mode of revocation usually char ct n es lo g past things—whence the illusion

[1] Again I omit the future merely for simpl city s sake

Chapter XVI

MEMORY

In the last chap a the direct *intuition* of time We found it limited to ders extends the rection or another of as real and form a systematic order of them by giving to each a date the relation of conceived to intuited time is just like that of the fictitious space pictured on the flat back scene of a theatre to the actual space of the stage The objects painted on the latter (trees columns houses in a receding street etc.) objects solidly placed upon the latter and we

can as in our memory and yet often imagine that we have depths.

The stream of thought flows on but most of its segments fall into the bottomless abyss of oblivion Of some no memory survives the instant of their passage Of others it is confined to a few moments hours or days Others again leave estiges which are indestructible and by means of which they may be recalled as long as life endures Can we explain these differences?

Primary Memory

The first point to be noticed is that *for a state of mind to survive in memory it must have endured for a certain length of time* In other words it must be what I call a substantive state Prepositional and conjunctival states of mind are not remembered as independent facts—we cannot recall just how we felt when we said how or notwithstanding Our consciousness of these transitive states is shut up to their own moment—hence one difficulty in introspective psychologizing

Any state of mind which is shut up to its own moment and fails to become

self in the manner explained in Chapter X. All the intellectual value for us of a state of mind depends on our after memory of it. Only then is it combined in a system and knowingly made to contribute to a result Only then does it *count* for us. So that *the* EFFECTIVE *consciousness we have of our states is the after consciousness* and the more of this there is the more influence does the original state have and the more permanent a factor is it of our world An indelibly imprinted pain may color a life but as Professor Richet says

of these cases But we must admit the possibility that to some extent the varia tions of time estimate between youth and age and excitement and *ennui* are due to such causes more immediately than the one we assigned some time ago

But whether our feeling of the time which immediately past[1] *events have filled be of something long or of something short it is not what it is because those events are past* but *because they have left behind them processes which are present To those processes however caused the mind would still respond by feeling a specious present with one part of it just vanishing or vanished into the past* As the Creator is supposed to have made Adam with a navel—sign of a birth which never occurred—so He might instantaneously make a man with a brain in which were processes just like the fading ones of an ordinary brain The first real stimulus after creation would set up a process additional to these The processes would overlap and the new created man would unquestionably have the feeling at the very primal instant of his life of having been in existence already some little space of time

Let me sum up now by saying that we are constantly conscious of a certain duration—the specious present—varying in length from a few seconds to prob ably not more than a minute and that this duration (with its content per ceived as having one part earlier and the other part later) is the original in tuition of time Longer times are conceived by adding shorter ones by divid ing portions of this vaguely bounded unit and are habitually thought by us symbolically Kant s notion of an *intuition* of objective time as an infinite necessary continuum has nothing to support it The *cause* of the intuition which we really have cannot be the *duration* of our brain processes or our mental changes That duration is rather the *object* of the intuition which being realized at every moment of such duration must be due to a permanently present cause This cause—probably the simultaneous presence of brain processes of different phase—fluctuates and hence a certain range of variation in the amount of the intuition and in its subdivisibility accrues

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ing asleep A person w ll be mov ng or doing something in the room and a certain stage of

and w kes me a comes b ck it is true but not as belong ng to the pecio s present It has tion usu lly characteri es l ng past

Chapter XVI

MEMORY

In the last chapter what concerned us was the direct *intuition* of time. We found it limited to intervals of considerably less than a minute. Beyond its borders extends the immense region of conceived time past and future into one direction or another of which we mentally project all the events which we think of as real and form a systematic order of them by giving to each a date The relation of conceived to intuited time is just like that of the fictitious space pictured on the flat back scene of a theatre to the actual space of the stage. The objects painted on the latter (trees columns houses in a receding street etc.) carry back the series of similar objects solidly placed upon the latter and we think we see things in a continuous perspective when we really see thus only a few of them and imagine that we see the rest The chapter which lies before us deals with the way in which we paint the remote past, as it were upon a canvas in our memory and yet often imagine that we have direct vision of its depths.

The stream of thought flows on but most of its segments fall into the bottomless abyss of oblivion. Of some no memory survives the instant of their passage Of others, it is confined to a few moments hours or days Others again leave vestiges which are indestructible and by means of which they may be recalled as long as life endures. Can we explain these differences

Primary Memory

The first point to be noticed is that *for a state of mind to survive in memory it must have endured for a certain length of time* In other words it must be what I call a substantive state Prepositional and conjunctival states of mind are not remembered as independent facts—we cannot recall just how we felt when we said how or notwithstanding Our consciousness of these transitive states is shut up to their own moment—hence one difficulty in introspective psychologizing

Any state of mind which is shut up to its own moment and fails to become an object for succeeding states of mind is as if it belonged to another stream of thought Or rather it belongs only physically not intellectually to its own stream forming bridge from one segment of it to another but not being appropriated inw

self in the mar

tate of mind depends on our a ter-thought

a system d known l made to contribute to a result. Only then does it co

mpressed pain may color a life but, as Professor Richet say

To suffer for only a hundredth of a second is not to suffer at all and for my part I would readily agree to undergo a pain however acute and intense it might be provided it should last only a hundredth of a second and leave after it neither reverberation nor recall [1]

Not that a momentary state of consciousness need be practically resultless Far from it such a state though absolutely unremembered might at its own moment determine the transition of our thinking in a vital way and decide our action irrevocably [2] But the *idea* of it could not *afterwards* determine transition and action its content could not be conceived as one of the mind s permanent meanings that is all I mean by saying that its intellectual value lies in after memory

As a rule sensations outlast for some little time the objective stimulus which occasioned them This phenomenon is the ground of those after images' which are familiar in the physiology of the sense organs If we open our eyes instantaneously upon a scene and then shroud them in complete darkness it will be as if we saw the scene in ghostly light through the dark screen We can read off details in it which were unnoticed whilst the eyes were open [3]

In every sphere of sense an intermittent stimulus often enough repeated produces a continuous sensation This is because the after image of the impression just gone by blends with the new impression coming in The effects of stimuli may thus be superposed upon each other many stages deep the total result in consciousness being an increase in the feeling s intensity and in all probability as we saw in the last chapter an elementary sense of the lapse of time (see p 416)

Exner writes

[1] *L Homme et l Intelligence* p 32

nother place (*Revue philo* ... *u thout memory no co* ... nsciou ess known outside of itself Of the sort of c nsciousness that is an object for later states a d becomes as it were permanent he gives a good e ample Who of us alas! has not experienced a b tter and profound grief the immense laceration caused by the death of some cherish d fellow being? Well in these great griefs the present endures neither f r a minute for n hour nor for a day but for weeks and months The memory of the cruel moment w ll not effac itself from consciousness It disappears not but remains l ving present coe ist ng w ith the multitude of other sensations which are juxt posed in consciousness alongside of this on persistent emotion which is felt al ways in the p sent tense A long time is ne ded ere we can attain to forg ttin it ere e can make it e ter into the past *Hæc et latere letal s arundo* (*ibid* p 583)

[3] This is the primary positive after ima e According to Helmholt one th d of a se o d is the mo t favorable length of exposure to the light for producing it Long r e posure compl cated by subsequent admiss n f l ght to the eye re ults i the ord nary gative a d complementary after images ith their cha ges whi h may (if the orig n l impressi n was b illiant and the fixat on long) last for many minutes F h r gi es the name of mem ry after images (*Psychophysik* II p 492) to the i stantane us po tive effects and distin u h s them from ordinary after images by the following characters 1) Th ir originals must h a e been *atte ded to* only such parts of a compound ori ginal as hav be n attended to ap pe

for the ordinary after mage 4) The c lors of the memory aft r image re never compl e mentary of those of the ori ginal

n f an image n the memory that

Impress ons to
t s usually over
o r attention m.
st okes. Such ex
of this pri ary
a rr
I
1

to the imp es n r not an extr mely
fr m e ry sort of after mage or hallucination It vanishes if not caught by atten
ti n, in th cou se f a fe v sec nds Even when the original impression is attended
to the li eliness of ts image in memory fades fast [1]

The physical condition in the nerve tissue of this primary memory is called
I [2] I much prefer to reserve the word memory

1

Chapter V we saw to be the groundwork of hab
the better name for what Professor Richet means Well the first manifesta
t on of elementa h l w d ng away of an impressed movement on
the neural matte
mem ry But w
objects we feel in this direc
j cts An object wh ch is recollected in the proper sense of that term is one
which has been absent from consciousness altogether and now revives anew
It br ght b ck recalled fished up so to speak from a reservoir in which
1 h h ects t lay buried and lost from view But an object of

w h h we directly intu t has a b eadth of several seconds a rearward and a for
ward nd, and may be called the specious present All stimuli who e first nerve-
v brat ns have not yet ceased seem to be conditions of our getting th s feelin
of the pecious p esent They give rise to objects which appear to the mind as
e e ts just past

When we have been exposed to an unu ual stimulus for many minutes or
hours a nervous process is set up which results in the haunting of consciousness

hv the impression for a long time afterwards The tactile and muscular feelings

thread tied around the finger an unusual constriction in the clothing will feel as if still there long after they have been removed These revivals (called phenomena of *Sinnesgedachtniss* by the Germans) have something periodical in their nature [1] They show that profound rearrangements and slow settlings into *a new equilibrium are going on in the neural substance* and they *form the tran* sition to that more peculiar and proper phenomenon of memory of which the rest of this chapter must treat The first condition which makes a thing suscep tible of recall after it has been forgotten is that the original impression of it should have been prolonged enough to give rise to a *recurrent* image of it as distinguished from one of those primary after images which very fleeting im *pressions may leave behind* and which contain in themselves no guarantee that they will ever come back after having once faded away [2] A certain length of stimulation seems demanded by the inertia of the nerve substance Exposed to a shorter influence its modification fails to set and it retains no effec tive tendency to fall again into the same form of vibration to which the original feeling was due This as I said at the outset may be the reason why only sub stantive and not transitive states of mind are as a rule recollected at least as independent things The transitive states pass by too quickly

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[1] *Cf* Fechner *Psychophysik* II p 499

[2] *The primary after mage it elf cann t be utilized if the stimulus is too bri f* Mr C tt ll found (*Psychologische Stud en* III p 93 ff) that the color of a l ght must fall upon the eye for a period varying f om 0 00275 to 0 006 in order to be recognized f r what it is l tters *of the alphabet nd famil* m to 0 00175 —truly an l ter al x tremely sho t Some letter Baxt h d ascertained that *latter quenched the f rmer* f rst stimulus v s letters of the alphabet the sec nd a bright hite dis of 0048 ec between the two ex h th h tract in *Ladd s Phy olog l Psychology* p 480] the dark ppe val of 0 0096 sec letters appeared reco nized hen th interval incre sed see the objects w re a l ttl m re clearly disc rned at 0 00336 sec f r letters c uld be w reco ized at 0 0432 sec f e l tte s and at 0.0528 sec all the letters c uld be read (*P*

[3]

nce

ly

sumption made by many writers that the revival of an image is all that is needed to constitute the memory of the original occurrence. But such a revival is obviously not a *memory* whatever else it may be it is simply a duplicate a second event ... on with the first event except that it happens to ... may trike a ... this week it d d so last week and will do so *in sæcula sæc.* ... present clock stroke become aware of the past ones or the present stream recollect the ... nd resemble them? Assuredly not. And let ... and no ... recurr ... more th ... r nce each sou in its own kin Yesterday s feelin is dead and ... presence of to-day s is no reason why it should resuscitate A farther condition is required before the present image can be held to stand for a *past original*

That condition is that the fact ima ed by *expressly referred to the past* thought as *in the past* But how can we think a thing as in the past except by thinking of the past together with the thing and of the relation of the two And how can we think of the past? In the chapter on Time-perception we have seen that our intuitive or immediate consciousness of pastness hardly carries us more than a few seconds backward of the present instant of time Remoter dates are concei ed not perceived known symbolically by names such as last week 1850 or thought of by e ents hich happened in them as the ear in which we attended such a school or met with such a loss —So that if we wish to think of a particular past epoch we must think of a name or other ... of c tain concrete events associated therewithal Both must be

but ... of a fact in the past It must be dated in *my* past In other words I must think that I di ectly experienced its occurrence It must have that warmth and inti macy which w re so often spoken of in the chapter on the Self as characterizing all experiences appropriated by the thinker as his own

ed and ... tes th ... I bstract f m this complicati and nfin myself t those mem ries in hich th past is directly imaged in th mind, as w say intuiti ly known E... P ... k l gy I, p. 448 H w d th believers th suffici cy f th image f ... th cases here w rem mber that som thin did t h ppen—that we did t ... watch did not lock th door ... ? It is very hard t cc unt f these

... f past dat and place Wh I rem mber that I did not, t keeps loof th associat fuse th each ther but not w th t. This sense f fusi n, f the bel ... tog th f things, is most ... elation th sense f fusio is an equally ... e. B th elations demand most ... mental processes t know them, processes quite differe t f m that mere presenc ... bsence f an imag which does such servic in th cruder books.

by the impression for a long time afterwards The tactile and muscular feelings of a day of skating or riding after long disuse of the exercise will come back to us all through the night Images of the f [illegible] roscope will an [illegible] e instrument A [illegible] othing will feel as [illegible] still there long after they have been removed These revivals (called phenomena of *Sinnesgedachtniss* by the Germans) have something periodical in their nature[1] They show that profound [illegible]

[illegible] been forgotten is that the original impression of it should have been prolonged enough to give rise to a *recurrent* image of it as distinguished from one of those primary after images which very fleeting impressions may leave behind and which contain in themselves no guarantee that they will ever come back after having once faded away[2] A certain length of stimulation seems demanded by the inertia of the nerve substance Exposed to a shorter influence its modification fails to set and it retains no effective tendency to fall again into the same form of vibration to which the original feeling was due This as I said at the outset may be the reason why only substantive and not transitive states of mind are as a rule recollected at least as independent things The transitive states pass by too quickly

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[illegible] Mr Cattell fo[illegible] on the eye f[illegible] from 0 00175 to 0 006 in order to be recognized for what it is letters of the alphabet and familiar words r[illegible] from 0 00075 to 0 00175 —t[illegible] tremely short Some letters E for example are harder than others In 1871 Helmholtz and Baxt had ascertained that when an impression was immediately followed by an[illegible] latter quenched the former and prevented it from being known to later consci[illegible]ess The first stimulus was letters of the alphabet the second a bright white disk With [illegible] f 0 0048 [illegible] between the two excitations [I copy here the abstract in Ladd's *Phys[illegible]* *Psychol* 537 p 480] the disk appeared as scarcely a trace of a w[illegible] shimmer with an interval of 0 0096 sec letters appeared in the shimmer—one or two of which could be partially recognized when the interval increased to 0 0144 sec When the interval was made [illegible] the objects were a little more clearly discerned [illegible]

[illegible] sort of [illegible] knowledge is it requisite that definitely resembling [illegible] be there (cf p 307 ff) But as all [illegible] nceptual knowledge stands for intuitive knowl

sumption ma
needed to co
is obviously
second event having absolutely no connection with the
it happens to resemble it. The clock strikes to-day it struck yesterday and may strike a million times ere it wears out. The rain pours through the gutter this week it did so last week and will do so *in saecula saeculorum* But does the present clock stroke become aware of the past ones, or the present stream recollect the past stream because they repeat and resemble them Assuredly not. And let it *not* be said that this is because clock strokes and gutters are physical and not psychical objects for psychical objects (sensations for example) simply recurrin in successive editions will remember each other *on that account* no more than clock strokes do No memory is involved in the mere fact of recur
r edit ns of a feeling, are so man independent events

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But even this would not be memory Memory requires more than mere dating

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ing all experiences appropriated by the thinker as his own.

and terminates therein, I b tract from this complication, and nfine myself to those memories in hich th past is directly imaged in the mind, as we say intuitively known.

E pencer *Psy h logy* 1, p. 48. H w d th belie rs in th sufficiency f th image f rmulat the cases where we remembe that som thin did t happen—that we did not wind at watch did t lock th doo te.? It is very hard to account f these memories f mission. The image f winding th watch is just as present t my mind w when I remembe that I did ot wind it as if I remembered that I did. It must be differ ence in the mode of feeling th image which leads me to such different conclus ns in t tw cases. When I remember that I did wind it, I feel it grown to ethe with ts associates f past date and place. When I remember that I did t, it keeps aloof the associates fuse with each other b t not w th it. This sense f fus n, f th belo ing t ether f things, most subtle relation the sense f no fusion is an equally subtle ne. Both relations demand most mplex mental processes t know them, processes quit differe t f om that mere presence or absence f an image which does such service in th cruder books.

by the impression for a long time afterwards The tactile and muscular feelings of a day of skating or riding after long disuse of the exercise will come back to us all through the night Images of the field of view of the microscope will annoy the observer for hours after an unusually long sitting at the instrument A thread tied around the finger an unusual constriction in the clothing will feel as if still there long after they have been removed These revivals (called phenomena of *Sinnesgedächtniss* by the Germans) have something periodical in their nature [1] They show that profound rearrangements and slow settlings into a new equilibrium are going on in the neural substance and they form the transition to that more peculiar and proper phenomenon of memory of which the rest of this chapter must treat The first condition which makes a thing susceptible of recall after it has been forgotten is that the original impression of it should have been prolonged enough to give rise to a *recurrent* image of it as distinguished from one of those primary after images which very fleeting impressions may leave behind and which contain in themselves no guarantee that they will ever come back after having once faded away [2] A certain length of stimulation seems demanded by the inertia of the nerve substance Exposed to a shorter influence its modification fails to set and it retains no effective tendency to fall again into the same form of vibration to which the original feeling was due This as I said at the outset may be the reason why only substantive and not transitive states of mind are as a rule recollected at least as independent things The transitive states pass by too quickly

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[3] When th p

need be there

be th re

Memory is then the feeling of belief in a peculiar complex object but all the elements of this object may be known to other states of belief nor is there in h n rticular combination of them as they appear in memory anything so pe-

connected either mediately or immediately with our present sensations or emotional activities tends to be believed in as a reality The ense of a peculiar active relation in it to ourselves is what gives to an object the characteristic quality of reality and a merely imagined past event differs from a recollected one only in the absence of this peculiar feeling relation The electric current so to speak between it and our present self does not close But in their other determinations the re-recollected past and the imaginary past may be much the same In other words there is nothing unique in the *object* of memory and no special faculty is needed to account for its formation It is a synthesis of parts thought of as related together perception imagination comparison and reasoning being analogous syntheses of parts into complex objects The objects of any of these faculties may awaken belief or fail to awaken it *the object of memory is only a i object imag ed n the past* (usually very completely imagined there) *to hich the emotion of bel ef adheres*

Memory's Causes

Such bein the *phe omenon* of memory or the analysis of its object can we see how it comes to pass? can we lay bare its causes?

Its complete exercise presupposes two things

1) The *retent on* of the remembered fact

2) Its *remin scence recollection reproduction* or *recall*

m p e pon unless it might be b translating his word idea into thing thought of or object as explained so often before

There is [h says] a state of mind familiar to all men, in which we ar said to e- member In this ate t is certain we ha e ot in the mind the idea which we re trying t ha in t. How is t, then that we p oc d in the c urse of ur endea o to pr cure its int od ctı n into the mind If we ha e n t the idea tself we ha certain deas o ne ted with it. We run er th se deas, e after an ther in hopes that som on f them will uggest the dea we ar in quest f and if any ne of them does t is alway e so connected w th t as to call it up in the way of association. I meet an old cquaintan e, whose name I do n t emember and wish to ec lle t. I run er a umber f names in hopes that some f them m y be ass ciated with the dea f the indi dual. I think of all the circumstances in which I ha e seen him

assum en when th re is th eas, b t f (I I, p 3) This

Compare, h we p 63 Chapte IX. his escriptio f m m ry s *bj ct*

A general feeling of the past direction in time then a particular date conceived as lying along that direction, and defined by its name or phenomenal contents an event imagined as located therein, and owned as part of my experience —such are the elements of *every act of memory*

It follows that what we began by calling the image ' or copy ' of the fact in the mind is really not there at all in that simple shape as a separate idea Or at least, if it be there as a separate idea no memory will go with it What memory goes with is on the contrary a very complex representation, that of the fact to be recalled *plus* its associates the whole forming one object (as explained on page 178 Chapter IX) known in one integral pulse of consciousness (as set forth on p 179 ff) and demanding probably a vastly more intricate brain process than that on which *any simple sensorial image depends*

Most psychologists have given a perfectly clear analysis of the phenomenon we describe Christian Wolff for example writes

Suppose you have seen Mevius in the temple but now afresh in Titus house I say you *recognize* Mevius that is are conscious of having seen him before because although now you perceive him with your senses along with Titus house your imagination produces an image of him along with one of the temple and of the acts of your own mind reflecting on Mevius in the temple Hence the idea of Mevius which is reproduced in sense is contained in another series of perceptions than that which formerly contained it and this difference is the reason why we are conscious of having had it before For whilst now you see Mevius in the house of Titus your imagination places him in the temple and renders you conscious of the state of mind which you found in yourself when you beheld him there By this you know that you have seen him before that is you recognize him But you recognize him because his idea is now contained in another series of perceptions from that in which you first saw him [1]

Similarly James Mill writes

In my remembrance of George III addressing the two houses of parliament there is first of all the mere idea or simple apprehension the conception as it is sometimes called of the objects There is combined with this to make it memory my idea of my having
not in my po
and attitude the p p [illegible]
it —without having the other idea along with it that of my having been a witness of the scene If this explanation of the case in which we remember sensations is understood the explanation of the case in which we remember *ideas cannot occasion* much of difficulty I have a lively recollection of Polyphemus s cave and the actions of Ulysses and the Cyclops as described by Homer In this recollection there is first of all the ideas or *simple conceptions of the objects and acts and along with the*se ideas and so closely combined as not to be separable the idea of my having formerly had tho e same ideas And this idea of my having formerly had those ideas is a *very complicated idea including the idea of myself of the present moment remem*bering and that of myself of the past moment conceiving and the whole series of the states of consciousness which intervened between myself remembering and my*self conceiving* [2]

[1] *Psychologia Emp ica* § 174

[2] *Analysis* I, pp 330-31 Mill bel eved th t the various things remembered the self included enter consciousness *n the form f sep rate Ideas but so rap dly that they are* all

A simple scheme will now make the whole cause of memory plain Let *n* be a past event *o* its setting (concomitants date self present warmth and intimacy etc etc as already set forth) and *m* some present thought or fact which may appropriately become the occasion of its recall Let the nerve-centres active in the thought of *m* *n* and *o* be represented by M N and O respectively then the *existence* of the paths M—N and N—O will be the fact indicated by the phrase retention of the event *n* in the memory and the *excitement* of the brain along these paths will be the condition of the event *n*s actual recall The *retention* of *n* it will be observed is no mysterious storing up of an idea in an unconscious state It is not a fact of the mental order at all It is a purely physical phenomenon a morphological feature the presence of these paths namely in the finest recesses of the brain s tissue The recall or recollection on the other hand is a *psycho physical* phenomenon with both a bodily and a mental side The bodily side is the functional exc tement of the tracts and paths in question the mental side is the conscious vision of the past occurrence and the belief that we experienced it before

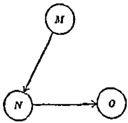


FIG 45

These habit worn paths of association are a clear rendering of what authors mean by predispos tions vestiges traces etc left in the brain by past experience Most writers leave the nature of these vestiges vague few think of explicitly assimilating them to channels of association Dr Maudsley for example writes

> Wh n an dea whi h we h e o c had s excited again th e is a rep oduction of the same n rvous curr t with the onscious additio that t is a eproduction— t is the same dea *plus* the c nsciousness that t s th m Th n then uggests i modification gical a tivity t may be s p ne ft -eff ct, as disposed to nsciousness as us phase i this phys ological di po ti n when it b comes acti e r discha ges its functions on the r currence of the part cular mental experie ce. T t n epti n of what may happen let owed with thei wn nsciousness modified in a ce tain w y by the they fall into the same a ti n on n ther o cas o th y h uld n t e gnize or emember t f r the s co d cti is a ep ducti n f the fir t with the ddit n f what t c ntains from the aft effects f the fi t. As w ha as um d the p cess t be conscious this ep oduction with its ddition would be memory r rememb an

In this passage Dr Maudsley seems to mean by the nerve-element or anatom cal substratum of fibres and cells something that corresponds to the N of our diagram And the modificat on he speaks of seems intended to be understood as an int rnal modification of this same particular group of elements Now

H. Maudsley *The Phy iology f M d* (Lo d 8 6) p 5 3

> engaged the time when I knew him the persons along with whom I knew him the things he did or the things he suffered and *if I chance upon any idea with which* the name is associated then immediately I have the recollection if not my pursuit of it is vain [1] There is another set of cases very familiar but affording very important evidence on the subject. It frequently happens that there are matters which we desire not to forget What is the contrivance to which we have recourse for preserving the memory—that is for making sure that it will be called into existence when it is our wish that it should? All men invariably employ the same expedient They endeavor to form an association between the idea of the thing to be remembered and ome sensation or some idea which they know beforehand will occur at or near the time when they wish the remembrance to be in their minds If this association is formed and the association or idea with which it has been formed occurs the sensation or idea calls up the remembrance and the object of him who formed the association is attained To use a vulgar instance a man receives a commission from his friend and that he may not forget it ties a knot in his handkerchief How is this fact to be explained? First of all the idea of the commission is associated with the making of the knot Next the handkerchief is a thing which it is known beforehand will be fre- *quently seen and of course at no great distance of time from the occasion on which* the memory is desired The handkerchief being seen the knot is seen and this sensa tion recalls the idea of the commission between which and itself the association had been purposely formed [2]

In short we make search in our memory for a forgotten idea just as we rum mage our house for a lost object In both cases we visit what seems to us the probable *neighborhood* of that which we miss We turn over the things under which or within which or alongside of which it may possibly be and if it lies near them it soon comes to view But these matters in the case of a mental object sought are nothing but its *associates* The machinery of recall is thus the same as the machinery of association and the machinery of association as we know, is nothing but the elementary law of habit in the nerve centres

And this same law of habit is the machinery of retention also Retention means *liability* to recall and it means nothing more than such liability The *only proof of there being retention is that recall actually takes place* The re- tention of an experience is in short but another name for the *possibility* of thinking it again or the *tendency* to think it again with its past surroundings Whatever accidental cue may turn this tendency into an actuality the perma nent *ground* of the tendency itself lies in the organized neural paths by which the cue calls up the experience on the proper occasion together with its past associates the sense that the self was there the belief that it really happened etc. etc just as previously described When the recollection is of the ready sort the resuscitation takes place the instant the occasion arises when it is slow resuscitation comes after delay But be the recall prompt or slow the con dition which makes it possible at all (or in other words the retention of the experience) is neither more nor less than the brain paths which *associate* the ex perience with the occasion and cue of the recall *When slumbering these paths are the condition of retention when active they are the condition of recall*

[1] Professor Bain adds in a note to this passage f Mill s This process seems best e pressed by laying down a *law of Compound or Composite Associ tion* under which a plurality of feeble links of conn ction may be a substitute for one powerful and self s fficin link. [2] *Analy is* ch p x.

ter a fr end s room and see on the wall a paintin. At first I have the strange wonderin consciousness surely I have seen that before but when or how does not become clear There only clings to the picture a sort of penumbra of

pai tin was once before excited in a similar way it l es simply and solely in the fact that with that brain tract other tracts also are excited those which sustain my friend s room with all its peculiarities on the one hand those which sus tain the mental image of the Florence Academy on the other hand with the cir cumstances of my visit there and finally those which make me (more dimly) think of the years I have lived through between these two times The result of this total brain disturbance is a thou ht with a peculiar object namely that I who now stand here with this picture before me stood so many years a o in the

I meet casually in the t eet a person whose ppearance I am acquai ted with and say to my elf t once that I ha e en him b fo e I stantly the figu e reced s i to th p st and wavers ab ut the e v g ely witho t at o ce fixing t elf in any pot. It persists in me f r some time, and surrounds tself with new details. When I saw him he was b e headed with a w king jacket on painting in a studio he is so and o of such a d uch a st eet. But whe was it? It was not yesterday n r this we k, nor ecently I ha e it he told me that he w s wa t ng for the first lea es to c me o t to go into the country It was bef e the spring But at wh t exact date? I saw the same day people carrying b anche in the str ets and mnibuses it was P lm Sunday! Ob erve the tra els of the internal figu it various hiftings to f o t and rea along the line of the pa t each of these m ntal sentences has been a s g of the balan e. When c f o ted with the p ese t se sati n and with the latent s arm f indi t nct images which repeat our ece t life the figure first recoiled sud denly to an ind terminate distance. Then complet d by p ec se deta ls and con fr ted with all th sho tened im ges by whi h we sum up the p oceedin s of a day a week t again eceded beyo d the p esent day beyond y sterday the day be fo e th we k still f rth b yo d the ill d fi ed mass constituted by our recent recollection Then som thi g said by the painter wa recalled nd it at once receded gain bey nd an almost p ec e limit which is marked by the im ge of the green lea es and denoted by the word spring A moment afterwa ds thanks to a new de tail the ecolle tion of the branches, it has shifted again but forwa d thi time not back ard and, by a reference to the calenda s s tu ted at a precise point, a week f ther ba k than East and five weeks nearer than the carnival by the double effect of the o trary impul ons pushing it ne f rward a d the other backward and which are at a particular moment annulled by one an th r

The Conditions of Goodness in Memory

The remembered fact being *n* then the path N—O is what arouses for *n* its setting when it *is* recalled and makes it othe than a mere imagination The path M—N on the other hand gives the cue or occasion of its be n recalled at all *Memory be g th s alt gethe co d tioned on bra n paths its excellence in a*

I telli ne 1, pp. 58–59

the slightest reflection will convince anyone that there is no conceivable ground *for supposing that with the mere re excitation of N there should arise the* con sciou addition that it is a re excitation The two excitations are simply two ex citations their consciousnesses are two consciousnesses they have nothing to do with each other
first excitation h
fication can only
This might make it less *conscious* perhaps but could not endow it with any ref erence to the past The gutter is worn deeper by each successive shower but not for that reason brought into contact with previous showers Psychology (which Dr Maudsley in his next sentence says affords us not the least help in this mat ter) puts us on the track of an at least possible brain explanation As it is the *setting o* of the idea when it recurs which makes us conscious of it as past so it can be no *intrinsic* modification of the [1] nerve element N which is the organic condition of memory, but something extrinsic to it altogether namely its con nections with those other nerve-elements which we called O—that letter stand ing in the scheme for the cerebral substratum of a great plexus of things other than the principal event remembered dates names concrete surroundings real ized intervals and what not The modification is the formation in the plastic nerve substance of the system of associative paths between N and O

The only hypothesis in short to which the facts of inward experience give countenance is that *the brain tracts excited by the event proper and those ex cited in its recall are in part different from each other* If we could revive the past event without any associates we should exclude the possibility of memory and simply dream that we were undergoing the experience as *if for the first* time [1] Wherever, in fact the recalled event does appear without a definite set ting it is hard to distinguish it from a mere creation of fancy But in proportion as its image lingers and recalls associates which gradually become more definite it grows more and more distinctly into a remembered thing For example I cn

[1] The only fact which might plausibly be alleged against this view is the familiar one that we may feel the lap e of time in an e perience so monotonous th t its earlier portions can have no associates different from its later ones Sit with closed eyes for example and steadily pronounce some vowel sound thus *a—a—a—a—a—* thinking only of the sound Nothing changes during the time occupied by the experiment and yet at the end of

to i e ta
experience has gone on so
into a single conc pti n of the *k d of tl ng* that has been go ng on with a mo e or l ss clear s nse of the total time it has laste l this latter being based on an *automatic counti g* of the successive pulses of tho ght by which the proc ss is from m m nt to moment rec g nized as be ng always th same W thi the f w sec nds which constitute the pecious pres t there is an *intu tive perception of the success e moments.* But these moments, of wh ch we have a p imary mem ry image are not p perly *r called* from the past our knowledge f them is in no way analog us to a m m ry prope ly so called *Cf s pra* p 423

But there comes a time of life for all of us when we can do no more than hold our own in the way of acquisitions when the old paths fade as fast as the new ones form in our brain and when we forget in a week quite as much as we can learn in the same pace of time ... last many many years In extreme old age it is upset in th ... acquisition or rather there is n ... the course of a few minutes of conversation the same question ... answer forgotten half a dozen times Then the superior tenacity of the paths formed in childhood becomes manifest the dotard will retrace the facts of his earlier years after he has lost a ...

So much for the permanenc ...

It is obvious that the more the e ... the more of such poss'ble cues or occasions for the recall of *n* in the mind the prompter and surer on the whole the memory of *n* will be the more frequently one will be reminded of it the more avenues of approach to it one will possess In mental terms *the more other facts a fact is associated with in the mind the better possession of it our me nory reta n* Each of its associates becomes a hook to wh ch it hangs a means to fish it up ... gether they form a network of attachm ... tissue of our thought. The secret o ... ng di erse and multiple associat or ... forming of associat ons with a fac ... much as poss ble? Br efly then of ... and the same amount of mere natu ... *pe e ces most* and weaves them ... *be the one with the best memo y* We see examples of this on every hand Most men ha e a good memory for facts connected with their own pursuits The col l ge athlete who remains a dunce at his books will astonish you by his knowl edge of men s records in various feats and games and will be a walking dic ti nary of sporting statistics The reason is that he is constantly going over these thi gs in his mind and comparin and making series of them They form for him not so many odd facts but a concept system—so they stick So the mer chant remembers prices the polit cian other politicians peeches and votes with a cop ousness which amazes outsiders but which the amount of thinking they bestow ... expla ns The great memory for facts which a D rwin a ... sess on on ... t nti enes ... ory as that ... to th ir st ... these the u ... while the theorist may have little if any desultory memory Unutilizable facts may be unnoted by him and fo gotten as soon as heard An gnorance almost as

him, and ga th exact day f his birth t th w nd f all B t th secr t f this curacy was th t, ha ing picked p some day prev sly an rmy gist h had dly turned over ts list f ames, with dates f birth graduati p m ti ns tc. ttached and when the colonel name was menti ed to him t th cl b, these figures, wh ch h had n t bestow d moment th ght, in luntarily surged p in his mind S ch m mory is f course pri eless boon.

given individual will depend partly on the number and partly on the persistence of these paths

The persistence or permanence of the paths is a physiological property of the brain tissue of the individual whilst their number is altogether due to the facts of his mental experience Let the quality of permanence in the paths be called the native tenacity or physiological retentiveness This tenacity differs enormously from infancy to old age and from one person to another Some minds are like wax under a seal—no impression however disconnected with others is wiped out Others like a jelly vibrate to every touch but under usual conditions retain no permanent mark These latter minds before they can recollect a fact must weave it into their permanent stores of knowledge They have no *desultory* memory Those persons on the contrary who retain names dates and addresses anecdotes gossip poetry quotations and all sorts of miscellaneous facts without an effort have desultory memory in a high degree and certainly owe it to the unusual tenacity of their brain substance for any path once formed therein No one probably was ever effective on a voluminous scale without a high degree of this physiological retentiveness In the practical as in the theoretic life the man whose acquisitions *stick* is the man who is always achieving and advancing whilst his neighbors spending most of their time in relearning what they once knew but have forgotten simply hold their own A Charlemagne a Luther a Leibnitz a Walter Scott any example in short of your quarto or folio editions of mankind must needs have amazing retentiveness of the purely physiological sort Men without this retentiveness may excel in the *quality* of their work at this point or at that but will never do such mighty sums of it or be influential contemporaneously on such a scale [1]

[1] Not that *mere* native tenacity will make a man great It must be coupled with great passions and great intellect besides Imbeciles ometimes have extraordinary desultory memory Drobisch describes (*Empirische Psychol* p 95) the case of a young man wh m he examined He had with difficulty been taught to read and spe k But if two or three minutes were allowed him to peruse an octavo page he then could spell the single words out from his memory as well as if the book lay open before him That there was no deception I could test by means of a new Latin la v dissertation which had just come into my hands which he never could have seen and of v hich both subj ct and language were unknown to him He read off [mentally] many lines skipping about too of the page wh ch had been given him to see no worse than if the e periment had been made with a childs story Drobisch describes this case as if it were one of unusual persistence in the visual image [primary memory *vide sup a* p 421] But he adds that the youth remembered h s pages a long time In the *Jou al of Specul t ve Ph losopl y* for Ja 1871 (1 6) is n account by Mr W D Henkle (t gether with the stock class c examples of p eternatur l memory) of n almost blind Pennsylvania farmer who could remember the day of the week on which any date had fallen for forty two years past a d lso the kind of weath r it was and what he was doing on each of more th n fift en thousand days Pity that such a m g fice t f culty s th could not have found more worthy application!

living in numb ed st ts add esses wh h th y themselvs ha e l nce mo ed way from and forgott n He says th t he hould probably recognize an indiv dual fly if h had seen him thirty y rs p evious—he is by the w y an t mol gi t As n n tan e of hi desultory mem ry he w s intr duced t certain col nel at a club The c nversation f ll upon the signs of age in man The col nel challe g d him to estimate his a e H looked at

But there comes a time of life for all of us when we can do no more than hold our own in the way of a[illegible] when the old paths fade as fast as the new ones form in our brain

lear

exti

acqu[illegible]

the course of a few minutes of conversation the same q[illegible] answer forgotten half a dozen times. Then the superior tenacity of the paths formed in childhood becomes manifest the dotard will retrace the facts of his earlier years after he has lost all those of later date

So much for the permanence of the paths. Now for their number

It is obvious that the more there are of such paths as M—N in the brain and the more of such possible cues or occasions for the recall of *n* in the mind the prompter and surer on the whole the memory of *n* will be the more frequently one will be reminded of it the more avenues of approach to it one will possess. In mental terms, *the more other facts a fact is associated with in the mind the better possession of it our memory retains* Each of its associates becomes a hook to which it hangs a means to fish it up by when sunk beneath the surface Together they form a network of attachments by which it is woven into the entire tissue of our thought. The "secret of a good memory" is thus the secret of forming diverse and multiple associations with every fact we care to retain But this forming of associations with a fact what is it but *thinking about* the fact as much as possible Briefly then of two men with the same outward experiences and the same amount of mere native tenacity *the one who* THINKS *over his experiences most* and weaves them into systematic relations with each other *will be the one with the best memory* We see examples of this on every hand Most men have a good memory for facts connected with their own pursuits. The college athlete who remains a dunce at his books will astonish you by his knowledge of men's records in various feats and games and will be a walking dictionary of sporting statistics The reason is that he is constantly going over these things in his mind and comparing and making series of them. They form for him not so many odd facts but a concept system—so they stick. So the merchant remembers prices the politician other politicians' speeches and votes, with a copiousness which amazes outsiders but which the amount of thinking they bestow on these subjects easily explains. The great memory for facts which a Darwin and a Spencer reveal in their books is not incompatible with the possession on their part of a brain with only a middling degree of physiological retentiveness. Let a man early in life set himself the task of verifying such a theory as that of evolution and facts will soon cluster and cling to him like grapes to their stem. Their relations to the theory will hold them fast and the more of these the mind is able to discern, the greater the erudition will become Meanwhile the theorist may have little if any desultory memory Unutilizable facts may be unnoted by him and forgotten as soon as heard. An ignorance almost as

him, and gave the exact day [illegible] his birth, to the wonder [illegible] all. But the secret [illegible] this curacy was that, having packed up some days previously an arm[illegible] register he had [illegible] turned over its list of names, with dates [illegible] birth, graduation, promotions, [illegible] tached, and when the colonel['s] name was mentioned to him [illegible] the club, these figures, [illegible] which he had [illegible] bestowed [illegible] moment [illegible] involuntarily served up in his mind. Such [illegible] memory is [illegible] course [illegible] priceless boon.

as it were in
have had much to do with scholars and
will readily think of examples of the class of mind I mean

In a system every fact is connected with every other by some thought relation The consequence is that every fact is retained by the combined suggestive power of all the other facts in the system and forgetfulness is well nigh impossible

The reason why *cramming* is such a bad mode of study I
mean by cramming that

thus in a few hours on one oc
purpose cannot possibly have formed many associations with other things in the mind Their brain processes are led into few paths and are relatively little liable

open to so many paths of ap
ons Th
why hab

the best method of study But
and students themselves should understand the reason why

One's Native Retentiveness Is Unchangeable

It will now appear clear that *all improvement of the m*
ELABORATING THE ASSOC

n once for all with his organiza
which he can never hope to change It differs no doubt in disease and health and it is a fact of observation that it is better in fresh and vigorous hours than when we are fagged or ill We may say then that a man s native tenacity will fluctuate somewhat with his hygiene and that whatever is good fo
of health will also be good fo

tentiveness But more than this we
not say and this it is obvious is far less than most people believe

It is in fact commonly thought

ering facts at large And a plausible case is always made out by saying that practice in learning words by heart makes it easier to learn new words in the same way [1] If this be true then what

[1] *Cf* Ebbinghaus *Über das Gedächtniss* (1885) pp 67 45 One may hear a person say I have a very poor memory because I was never systematically made to learn poetry at school.

I have just said is false and the whole doctrine of memory as due to paths must be revised But I am dispo ed to think the alleged fact untrue I have carefully questioned several mature actors on the point and all have denied that the pract ce of learning parts has made any such difference as is alleged What it has d e f r them is to i d n part systematically Their
n
t
f

better remembering by better u i g ...
practice in ease of learning by heart the improvement will I am sure be always found to res de in the *mode of study of the particular piece* (due to the greater interest the greater suggestiveness the generic similarity with other pieces the more sustained attention etc etc) and not at all to any enhance
i

distinguish between the general physiological ...
p t cular things and talks as if both mu t be benefited by the same means

k d to all
next m rning ...
d an ffort made t recall it at intervals T n names f m am ng pu c men e der d t be mm tted to memory e ery week. A erse of poetry is to be learned al a rse f om the B ble daily He is asked to remember the number of the page in any book whe e v te esting fact is r cord d. These and other methods are slo ly esuscitating failing mem ry

I find it very hard to belie e that the memory of the poor old gentleman is a b t the better f r all this torture except in respect of the particular facts thus wrought into it the occurrences attended to and repeated on those days the names of those politicians those Bible verses etc etc In another place Dr Holb ook quotes the account given by the late Thurlow Weed journalist and politician of his method of stre gthening his memory

H t St ength th M mory or Th N t al and Sc t fi M th ds f N For get ing By M H. H lb k M.D N w Y k (d t) H lb k, p cit p. 39

I could not then recall what I had for breakfast After a few days practice I found I could recall more Events came back to me more minutely more accurately and more vividly than at first After a fortnight or so of this Catherine said Why don t you relate to me the events of the day instead of recalling them to yourself? It would be interesting and my interest in it would be a stimulus to you Having great respect for my wife s opinion I began a habit of oral confession as it were, which was continued for almost fifty years Every night the last thing before retiring I told her everything I could remember that had happened to me or about me during the day I generally recalled the dishes I had had for breakfast dinner and tea the people I had seen and what they had said the editorials I had written for my paper giving her a brief abstract of them I mentioned all the letters I had sent and received, and the very language used as nearly as possible when I had walked or ridden—I told her everything that had come within my observation I found I could say my lessons better and better every year and instead of the practice growing irksome, it became a pleasure to go over again the events of the day I am indebted to this discipline for a memory of somewhat unusual tenacity and I recommend the practice to all who wish to store up facts or expect to have much to do with influencing men [1]

I do not doubt that Mr Weed s practical command of his past experiences

it and in the evening went over it again He did *more thinking* about it and it stayed with him in consequence But I venture to affirm pretty confidently (although I know how foolish it often is to deny a fact on the strength of a theory) that the same matter *casually attended to and not thought about* would have stuck in his memory no better at the end than at the beginning of his years of heroic self discipline He had acquired a better method of noting and recording his experiences but his physiological retentiveness was probably not a bit improved [2]

[1] Holbrook *op cit* p 100

[2] In order to test the op nion so confidently e pressed in the te t I have tried to see whether a certa n amount of da ly trai ing in learning poetry by heart will sh rten the time it takes to learn an entirely different kind of poetry During eight successive days I learned 158 lines of Victor Hugo s *Saty* The total number of minutes required for this was 131⅚ —it should be said that I had learned nothing by heart for many years I then working for twenty odd minutes daily learned the entire first book of *Pa adise Lost* occupying 38 d ys in the p ocess After this tra ing I went back to Victor Hugo s poem and found that 158 additional lines (d vid d exactly as on the former occasion) took me 151½ minutes In other words I committed my V ctor Hugo to memory b fore the training at the rate of a line in 50 seconds after the training at the rate of a li e in 57 seconds just the opposite result from that which the popula i w would lead ne to expect But as I was perceptibly fagged with oth r work at the time of the second batch of Victor Hugo I thought that mi ht explain the retardation so I persuaded several other persons to repeat the test.

Dr W H Burnham learned 16 lines of *In Memo iam* for 8 days time, 14–17 minutes—daily average 14⅞ He th n t ained himself on Schiller s translation of the second b ok of *The E eid* into German 16 l es daily f r 26 consecut ve days On r turni g t th same quant ty of *In Memoriam* again he found his maximum time 20 m nut s mi im m 10 average 14 As he feared the outer conditions might not have been as favorabl this tim as the first he waited a few days and got conditions as ne rly identical as possible The result was minimum time 8 minutes m imum 19½ average 14 7/10

Mr E S Drown tested h mself on Virgil for 16 days then again for 16 days after training himself on Scott. Average time before training 13 minutes 26 sec nds after training

All improvement of *
ual methods of record
vided into the mechan
The *mechanical me*

etition of the impression to be remembered The modern u
children to read by blackboard work in which each word is impressed by the
f f ld channel of eye ear voice and hand is an example of an improved me-

ing them into parts etc etc All the sciences
Of *inge ious methods* many have been invented under the name of technical
often possible to retain entirely dis

secure and permanent possession Then
erately associated by some fanciful analogy or connection with some part of this framework and this connection thenceforward helps its recall The best known and most used of these de ices is the figure-alphabet To remember numbers e g a figure-alphabet is first formed in which each numerical digit is represented by one or more letters The number is then translated into such letters as will best make a word f possible a word suggestive of the object to which the number belongs The ord will then be remembered when the numbers alone mi ht be forgotten

minutes 6 seco d [Sixteen d ys is too l ng f th test it gi es time f trainin n the test rse]

M C H Baldwin t k lines f 5 d ys as his te.t trained himself 45 lines f an entirely diff re t verse and then to k 5 days m re n the f rm erse t lines day A erag result 3 min tes 4 sec ds bef e 3 min tes eco ds after training [Same criticism as bef e.]

Mr E A. P ase tested himself *Idylls f th King* and trained himself n *Paradis Lo t* A rage re ult f 6 da s ch tim 4 min tes 4 sec ds bef re 4 min tes 55 se ds fte training Mr Burnham ha ing ggested that t eliminat facilitating ffect tirely from th training rses u.ht t test self *à la* Ebbingha n series f nonsense syllables, ha ing anal gy wh tever with any sy t m f expressi erses, I ind ced tw f my t dents t perf rm that experiment also. Th rec d is unf rt t ly l t b t th result was ery considerabl sh rtening f th erage tim f th se d series f nsense-syll bles, learned fter training. This seems t me h w er m re t sh w th ff cts f rapid habituation to th nsense verses th msel es than those f th po try sed between them. B t I mean to prosecut th experiments farth and will report in th pla

One f my st dents h ing q ted clergyman f his quaintance wh had man ll sly imp ed b practice his pow f learning his serm ns by h art I w t t th gentl man f orr borati n. I ppend his reply which h w that th increased f cility is d rath t h his m thod f learnin than t his natu retenti e ess h ing g wn by ex

The most common figure alphabet is this

1	2	3	4	5	6	7	8	9	0
t	n	m	r	l	sh	g	f	b	s
d					j	k	v	p	c
					ch	c			z
					g	qu			

To briefly show its use suppose it is desired to fix 1142 feet in a second as the velocity of sound t t r n are the letters and order required Fill up with vowels forming a phrase like tight run and connect it by some such flight of the imagination as that if a man tried to keep up with the velocity of sound he would have a tight run When you recall this a few days later great care must be taken not to get con fused with the velocity of light nor to think he had a *hard* run which would be 3000 feet too fast [1]

Dr Pick and others use a system which consists in linking together any two ideas to be remembered by means of an intermediate idea which will be sug gested by the first and suggest the second, and so on through the list Thus

Let us suppose that we are to retain the following series of ideas garden hair, watchman philosophy copper etc We can combine the ideas in this manner *garden* plant hair of plant—*hair hair* bonnet *watchman* —*watchman* wake study *philosophy philosophy* chemistry *copper* etc etc [2]

It is a matter of popular knowledge that an impression is remembered the better in proportion as it is

1) More recent
2) More attended to and
3) More often repeated

The effect of recency is all but absolutely constant Of two events of equal significance the remoter one will be the one more likely to be forgotten The memories of childhood which persist in old age can hardly be compared with the events of the day or hour which are forgotten for these latter are trivial once-

en wrought into us

Other things equal

ption I can think of

is the unaccountable memory of certain moments of our childhood apparently not fitted by their intrinsic interest to survive but which are perhaps the only incidents we can remember out of the year in which they occurred Everybody probably has isolated glimpses of certain hours of his nursery life the position [illegible] he [illegible] tood or sat the light of the room what his father or mother said

[illegible]

to trace Very likely we were reminded of them again soon after they occurr[illegible] that became a reason why we should again recollect them etc so that at last they became ingrained

The *attention* which we lend to an experience is proportional to its vivid or in teresting character and it is a notorious fact that what interests us mo t vividly

[1] E Pick *Memory and its Doctors* (1888) p 7

[2] Pick *op cit* This system is c rried o t in r t detail in a book cal ed *Memory Trai ing* by Wm L. Evans (1889)

at the time is, other things equal, what we remember best. An impression may be so exciting emotionally as almost to leave a *scar* upon the cerebral tissues; and thus originates a pathological delusion. 'A woman attacked by robbers takes all the men whom she sees, even her own son, for brigands bent on killing her. Another woman sees her child run over by a horse; no amount of reasoning, not even the sight of the living child, will persuade her that he is not killed. A woman called 'thief' in a dispute remains convinced that every one accuses her of stealing (Esquirol). Another, attacked with mania at the sight of the flames in her street during the Commune, still after six months sees in her delirium flames on every side about her (Luys), etc., etc.'[1]

On the general effectiveness of both attention and repetition I cannot do better than copy what M. Taine has written:

"If we compare different sensations, images, or ideas, we find that their aptitudes for revival are not equal. A large number of them are obliterated, and never reappear throughout life; for instance, I drove through Paris a day or two ago, and though I saw plainly some sixty or eighty new faces, I cannot now recall any one of them; some extraordinary circumstance, a fit of delirium, or the excitement of hashish would be necessary to give them a chance of revival. On the other hand, there are sensations with a force of revival which nothing destroys or decreases. Though, as a rule, time weakens and impairs our strongest sensations, these reappear entire and intense, without having lost a particle of their detail, or any degree of their force. M. Brierre de Boismont, having suffered when a child from a disease of the scalp, asserts that 'after fifty-five years have elapsed he can still feel his hair pulled out under the treatment of the *skull-cap*.'—For my own part, after thirty years, I remember feature for feature the appearance of the theatre to which I was taken for the first time. From the third row of boxes, the body of the theatre appeared to me an immense well, red and flaming, swarming with heads; below, on the right, on a narrow floor, two men and a woman entered, went out, and re-entered, made gestures, and seemed to me like lively dwarfs: to my great surprise one of these dwarfs fell on his knees, kissed the lady's hand, then hid behind a screen: the other, who was coming in, seemed angry, and raised his arm. I was then seven, I could understand nothing of what was going on; but the well of crimson velvet was so crowded, lighted, and bright, that after a quarter of an hour I was, as it were, intoxicated, and fell asleep.

"Every one of us may find similar recollections in his memory, and may distinguish in them a common character. The primitive impression has been accompanied by an *extraordinary degree of attention*, either as being horrible or delightful, or as being new, surprising, and out of proportion to the ordinary run of our life; this it is we express by saying that we have been strongly impressed; that we were absorbed, that we could not think of anything else; that our other sensations were effaced; that we were pursued all the next day by the resulting image; that it beset us, that we could not drive it away; that all distractions were feeble beside it. It is by force of this disproportion that impressions of childhood are so persistent; the mind being quite fresh

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be less upset now by a surgical operation than when he was a child.

"Whatever may be the kind of attention, voluntary or involuntary, it always acts thus: the image of an object or event is capable of revival, and of complete revival, in proportion to the degree of attention with which we have considered the object or

[1] P[illegible] L[illegible] [illegible] (18[illegible]) p. [illegible]

event We put this rule in practice at every moment in ordinary life. If we are applying ourselves to a book or are in lively conversation while an air is being sung in the adjoining room we do not retain it we know vaguely that there is singing goin on and that is all. We then stop our reading or conversation we lay aside all internal preoccupations and external sensations which our mind or the outer world can throw in our way we close our eyes we cause a silence within and about us and if the air is repeated we listen We say then that we have listened with all our ears that we have applied our whole minds If the air is a fine one and has touched us deeply we add that we have been transported uplifted ravished that we have forgotten the world and our elves that for some minutes our soul was dead to all but sounds.

This exclusive momentary ascendency of one of our states of mind explains the greater durability of its aptitude for revival and for more complete revival As the sensation revives in the image the image reappears with a force proportioned to that of the sensation What we meet with in the first state is also to be met with in the second since the second is but a revival of the first So in the struggle for life in which all our images are constantly engaged the one furnished at the outset with most force retains in each conflict by the very law of repetition which gives it being the capacity of treading down its adversaries th [illegible] ntly at first then frequently [illegible] tinual accession of new impre [illegible] find ing a clear field are abl [illegible] turn

A second cause of prolonged revivals is repetition itself Every one knows that to learn a thing we must not only consider it attentively but consider it repeatedly We say as to this in ordinary language that an impression many times renewed is imprinted more deeply and exactly on the memory This is how we contrive to retain a langua e airs of music passages of verse or prose the technical terms and propositions of a science and still more so the ordinary facts by which our conduct is regulated When from the form and color of a currant jelly we think of its taste or when tasting it with our eyes shut we imagine its red tint and the brill [illegible] f a quivering slice the images in our m d [illegible]

[illegible] of clear and easily reviving images [illegible] had their source in the [illegible] ice of numerous experiences and are [illegible] I want to go from the Tuileries to the [illegible] I fore ee at every turn the [illegible] d [illegible] will present them [illegible]

[illegible] n its [illegible] t is [illegible] the [illegible] interest diminishes but if other circumstances renew the interest or if the will renovates the attention the incessantly increa in tendency will incessantly increase the chances of the resurrection and integrity of the image[1]

If a phenomenon is met with however too often and with too great a variety of contexts although its image is retained and reproduced with corre pondingly great facility it fails to come up with any one particular setting and the projection of it backwards to a particular past date consequently does not come about.

[1] *Intelligence* 1 pp 77–81

We recogni e but do not remem ber it—its associates form too confused a cloud
Mr Spencer
No one i

that the
of th
bout is a h nimal To a k a man w
fi e burns that ron is hard would be a misuse of language. Even the almost o u
onne tio s am r xperiences cease t be cl ssed as memories when they ha e
become thor u, e of some unseen person
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These are cases wh
each other s way an
felt familiar ty or sens
when a definite setti g is only nascently aroused We then feel that
cannot say though we may seem to
t

we seek to remember a name It ting es t u
come Just such a tingling and trembl ng of unrecovered associates is the penum bra of recognition that may surround any experience and make it seem familiar though we know not why

P y k l gy §
Prof ss H ffding
th ght-of is pro f th
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mbin th th p ocess f th w imp essi to gi
ting hich sh ld separ t t f m th impressi ns wh ch th th bjects gi B t
g ti f this mmediate sort is bey d ur pow ft ry sh rt time has interven d
m t rval ll f t l to t th t t is impo sibl t th t

Her t is th all f th co tigu associ te th mb nam which brings bo t th ecogniti Wh an perc ce is mplex each l ment f th t tal bj ct has h d th her lem nt f ts past tigu us associat Each l m t th t ds t rev th th l ments from w thin t th sam tim th t th tw d bject is making th m vi fr m th W ha th s, when w meet f miliar bj t th t nse f pe tats grati- fi d hich is so la g f t in esth ti m ti and w ther n fring f t d cy t ard th ar usal f xtrinsic associates (hich th certainly alw y s) till

T —the feeling
before—we
this place to just these people etc Th s
e of pre existence has been treat d
much speculation Dr

ystery seems
succeeded in
whilst some
ed again the others are not The dissimilar por
tions of the past do not arise completely enough at first for the d
fied All we get is the present
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wa grows complete

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e v ped One can appeal to introspec
r example I go into a slaughter house into which I once went years
ago and the horrid din of the scream ng hogs strikes me h sen e of
identification when the ll o l case l to
h he din y
and all
s as familiar occupants of my mind;
the pa t time are anything but prominent A
th nk of an engraving say the portrait f D
do so only partially but when I
smitten with the intimate sense of
—where in the experience is h on in both these cases it surely
nd were also the moment when all
er s face recalls the f mer walls of
and they the face again ju t as I
In l ke manner the p cul r d epen
the moment when I open the book
ntense as to b nish from my m nd all c llate al
former e peri nces But h re it is the n se pre
r the eye the eye preparing them for the mouth h uth pr par ng th m
for the n se again all these or ct n as l f d d
or l im is
th u h
the f cts
lre dy
o th mind by n im e

u se ms h mself to bel tl at we r gn
se ation A by compa ng t with its own past image α (loc t p 225) h n
I alto ether fail to c ncur
D

p 142 ff

p ychology u u v l v p 1 6

Exact Measurements of Memory

have recently been made in Germany Professor Ebbinghaus in a really heroic serie h w ears duration examined the pow ers o hear —

ber more than 7 after a s ngle reading it too u ber 12 44 readings to remember 24 and 55 readings to remember 26 syllables the moment of remembering being here reckoned as the first moment when the list could be recited without a fault When a 16 syllable li t was read over a c d h n st died on the day following until t

as these li ts of y iac later on He measured list after it had been onds to learn the list — learnings would have been one half Measured in this way full half of the for getting seems to occur with n the first half hour whilst only four fifths is for gotten at the end of a month. The nature of this result m ght have been antici pated but hardly its numerical proportions Dr Ebbinghaus says

Th initial rap dity as well a th final sl wne s as these were asc rtained under rt experimental di ons and f a part cular di dual m y well surprise us An hour ft r the w k f learning had ceased forgetting w s so far d anced that m than half of the orignal w k had t be ppli d again before the se es of *syll bl s coud e m re be ep od ced.* E ght hours late t *o thirds of the original* lab had to be appli d. Gradually how er the p ess of obli on g ew sl wer o *that even fo onside ble st tches of time th los es we e but barely* ascertai able Aft 4 hours a thi d after 6 days a fourth and after a whole mo th good fifth *f the riginal labor emain d in th hape f ts fter-effects,* a d made the relearn ing b so m h the mo e peedy

could y ui u ca can pow — — —
wh ch it was never n i *nmed te* contact without passi g thro gh the interme- diat m tal links The question is of theoretic importance with regard to the w in wh ch the process of association of ideas must be conceived and Dr Ebb ghaus s attempt is as successful as it is original in bringing two views which seem at first igh inaccess ble to proof to a d rect practical test and giv ing the ictory to one of them His *experiments* conclusively *show* that an idea is ot only associated directly with the one that follows t and with the rest

Über das G dächtnis *perimentell* *L ter ch* g (1885) p 64
Ibid., 1 3. *Ib d* p 3.

(ued to impress lists of the same
s between them Thus representing the syllables by numbers
if the first list were 1 2 3 4 cond would be 1 3 5,
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other hand 1 has a *direct*
(as well as on 2 that influ
dropped out
one more rap atter case is what actually oc
curs and Dr Ebbinghaus has found that syllables
many as seven interm h

peak of all the rest These last re
to make us careful when we speak of nervous paths to use the
word in no restricted sense They add one more fact to the set of facts which
prove that association is subtler than consciousness and process
may without producing n which
evidently
consciousness) is facilitated broadened
ps by the old path from 1 to 3 through 2—*only* the component which
shoots round through this latter way is too feeble to let 2 be thought as a dis
tinct object

Mr Wolfe in his experiments on recognition used vibrating metal tongues

These tongues gave tones differing by 2 vibrations only in the two lower octaves and by 4 vibrations in the three higher octaves In the first series of experiments a tone was selected and after sounding it for one second a second tone was sounded which was either the same as the first or different from it by 4 8 or 12 vibrations in different series The person experimented upon was to answer whether the second tone was the same as the first thus showing that he recognized it or whether it was different and if so whether it was higher or lower Of course the interval of time between the two tones was an important factor The proportionate number of c rect judgments and the smallness of th

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tra
wit hands as an in pend
but ne hand being hidden by a scr n th patient w look at
anoth r creen and to tell f any visual image h ch mi ht proj ct itself th reon mbers
would then om resp nd n the number th ised
touched etc Colo
felt Th wh le
certain
n Th kin sensati n unl lt by th pa
tient s primary consciousness awaken n th less thei usu l sual associates therein.

tones would measure the accuracy of the tone memory. It appeared that one could tell more readily when the two tones were alike than when they were different, although in both cases the accuracy of the memory was remarkably good. The main point is the effect of the time interval between the tone and its reproduction. This was varied from 1 second to 30 seconds or even to 60 seconds or 120 seconds in some experiments. The general result is that the longer the interval, the smaller are the chances that the tone will be recognized, and this process of forgetting takes place at first very rapidly and then more slowly. This law is subject to considerable variations, one of which seems to be constant and is peculiar, namely there seems to be a rhythm in the memory itself which after falling recovers slightly and then fades out again.

This periodical renewal of acoustic memory would seem to be an important element in the production of the agreeableness of certain rates of recurrence in sound.

Forgetting

In the practical use of our intellect, forgetting is as important a function as recollecting.

Locke says in a memorable page of his dear old book:

The memory of some men, it is true, is very tenacious, even to a miracle; but yet there seems to be a constant decay of all our ideas, even of those which are struck deepest and in minds the most retentive; so that if they be not sometimes renewed by repeated exercise of the senses, or reflection on those kinds of objects which at first occasioned them, the print wears out, and at last there remains nothing to be seen. Thus the ideas, as well as children, of our youth often die before us; and our minds represent to us those tombs to which we are approaching; where, though the brass and marble remain, yet the inscriptions are effaced by time and the imagery moulders away. The pictures drawn in our minds are laid in fading colors, and, if not sometimes refreshed, vanish and disappear. How much the constitution of our bodies and the make of our animal spirits are concerned in this, and whether the temper of the brain makes this difference, that in some it retains the characters drawn on it like marble, in others like freestone, and in others little better than sand, I shall not here in[quire] th[oug]h it may seem probable that the constitution of the body does [s]om[e]ti[mes] ... [s]trip th[e] mi[n]d [o]f ... [i]m[a]ge[s] t[o] dust and confusion ...

This peculiar mixture of forgetting with our remembering is but one instance of our mind's selective activity. Selection is the very keel on which our mental ship is built. And in this case of memory its utility is obvious. If we remembered everything, we should on most occasions be as ill off as if we remembered nothing. It would take as long for us to recall a space of time as it took the original [illegible] filled them.

1 I copy from the abstract of W. Wolfe's paper in *Science* for Nov. 19, 1886. The original is *Psychologische Studien*, III, p. 534 ff.

2 *Essay Concerning Human Understanding*, bk. II, ch. x, § 5.

through that but th [illegible] though in [illegible] ie memory [illegible] e needed to impress lists of the same s [illegible] gaps between them Thus representing the syllables by numbers if the first list were 1 2 3 4 13 14 15 16 the second would be 1 3 5 15 2 4 6, 16 and so forth with many variations

Now if 1 and 3 in the first list were learned [illegible] der merely by 1 calling up 2 and by 2 calling [illegible] ave 1 and 3 with no tie [illegible] me in the learning as if [illegible] card of If on the other hand 1 has a *direct* influ[illegible] on 3 as well as on 2 that influence should be exerted even when 2 is dropped out and a person familiar with the first list ought to learn the second one more rapidly than otherwise he could This latter case is what actually oc curs and Dr Ebbinghaus has found that still [illegible] parated by as many as seven intern[illegible] y with which [illegible] earning estab[illegible] so to speak of all the rest These last re s[illegible] ought to make us careful when we speak of nervous paths to use the word in no restricted sense They add one more fact to the set of facts which prove that association is subtler than conscious [illegible] process may without produ[illegible] n which [illegible] evidently [illegible] onsciousness) is facilitated broadened [illegible] by the old path from 1 to 3 through 2—only the component which shoots round through this latter way is too feeble to let 2 be thought as a dis tinct object

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[illegible] self the on[illegible] mbers [illegible] th[illegible] men[illegible] me[illegible] pond[illegible] m when m nipulated nd fin lly [illegible] thing uld be f lt Th wh le [illegible] self bel w th th esh ld f cert in con [illegible] n associat[illegible] ffects th[illegible] Th skin sensati ns unf lt by the pa tient s primary consciousness, aw[illegible] n ne rth less, th[illegible] usual visual associates there n.

Hypnotic subjects as a rule forget all that has happened in their trance But in a succeeding trance they will often remember the events of a past one This is like what happens in those cases of double personality in which no recollection of one of the lives is to be found in the other We have already seen in an ea h ter that the sensibility often differs from one of the alternate per
so Janet s theory that anæsthe-
s
d
e
t

p
var ous objects such as keys and pencils
the s gn of the cross The moment the anæsthesia returned they found it impossible to recollect the objects or the acts They had had nothing in their hands they had done nothing etc The next day however sensib lity being again restored by similar processes they remembered perfectly the circumstance and
1

ion is no proof against possible recall under other cond
tenance however to the extravagant opinion that nothing we experience can be absolutely forgotten In real life in sp te of occasional surprises most of what h ppens actually is forgotten The only reasons for supposing that if the conditions we e forthcoming everything would revive are of a transcendental sort Sir W lli m Hamilton quotes and adopts them from the German writer Schmid Knowledge being a spontaneous self energy on the part of the mind

th en rgy being nc determi ed t is at al that it should persist until aga n annihil ted by other causes This [annihilati] would b the case were the mind m rely passi e. B t the m tal acti ty the act f kn wledg of which I now pe k, mo e than this t is an en gy of the s lf a t e powe of a subject one and indi is bl nseq ently part f th ego must be d tach d o annihilated if a cogni ti c existent be gain extinguish d. Hence t is that th p oblem m st difficult f l l t b w a mental act ty end es b t how t ev r vani hes

Those whom such an argument persuades may be left happy with their belief Other positive argument the e is none none certainly of a physiological sort [2]

Whe memory begins to decay proper names are what go first and at all times proper names are harder to recollect than those of general properties and classes of things

This seems due to the fact that common qualities and names have contracted an infinitely greater number of associations in our mind than the names of most of the persons whom we know The memory is better organi ed Proper names as w ll o ganized as those of our family and friends are recollected as well as

Lectur M taphy ics II p 2
Cf this point J Delbœ f Le S mmeil t les r s (885) p 9 ff R. V d n F rg tfulness, in M nd II, p 437

As fast as the present enters into the past o
and are obliterated P d

em the quantity of duration
...at being This deficit of surviving conscious states i thus a deficit in the amount of represented time The process of abridgment of foreshortening of which we have spoken presupposes this deficit If in order to reach a distant reminiscence we had to go through the entire series of terms which separate it from our present selves memory would become impossible on account of the length of the operation We thus reach the paradoxical result that one condition of remembering is that we should forget Without totally forgetting a prodigious number of states of consciousness and momentarily forgetting a large number we could not remember at all Oblivion except in certain cases is thus o m ly of memory but a condition of its health and it

u ch are as yet un
acc en on one day will be em n the next
Something we have ma h all in vain
u as Emer
it had never been sent for Experiences
rs of absolute obl v f

Coleridge s

a Roman Catholic town in Germany a young woman who could neither read nor write was seized with a fever and was said by the priests to be possessed of a devil because she was heard talking Latin Greek and Hebrew Whole sheets of her ravings were written out and found to consist of sentences intelligible in themselves but having slight connection with each other Of her Hebrew sayings only a few could be traced to the Bible and most seemed to be in the Rabbinical dialect. All trick was out of the question the woman was a imple creature there was no doubt as to the fever It was long before any explanation
possession could be obtained At last
determined to trace back the girl s hist
that at the age of nine she had been ch
great Hebrew scholar

uong them were found several of
n Fathers together with a collection of Rabbinical writings In these works so many of the passa es taken down at the young woman s bedside were identified that there could be no reasonable doubt as to the r source [2]

[1] Th R bot *Les Mal*

M ntal Physiol gy ch p
nt 1 k thi on i the
ev nich psychical res arch d m nds) C mp al Th
Rib t *Les Mal d es de la mém* e h p tv The kn l e of fo ign word re
ported in trance mediums etc may perhaps oft be e plai d by lt n f m mory
An hy t r p l ptic girl wh se case I qu t 1 *P c f lm S f P l al R* k
automatically w ites an *Ing ld by Leg* d in se al ant whi h h r parent say h l l
never read. Of course she must have ead or heard it but perh ps n ve *k ed* t Of some
macaronic Latin English v rses ab ut sea serpent h b her hand lso w t unc
scious ly I have vainly sought the o i inal (se *P c* etc p 553)

set our memory as it were to retain things for a certain time and then let them depart

T d d pl ften remember clearly and well up t the time when they have to use
t

The rationale of this fact is obscure and the existence of it ought to make us feel how truly subtle are the nervous processes which memory involves Mr Verdon adds that

When the use f a record is withdrawn and attention withdrawn f om t and we think no more about t we know that we experien e a feeling of relief and we may

takes pl ce the rec d does t s em o w ll c ns rved as before but that we have eal diffi ulty in attempting t emembe t

This shows that we are not as entirely unconscious of a topic as we think dur ing the time in which we seem to be merely retaining it subject to recall

Practically [says Mr Verd] we sometimes keep a matte in hand not exactly by attending to it, but by k eping o attention ef rred t something c nnect d with it from tim to time. Translating this into the la guage of phys logy we mean that by ferring ttenti n to a part within o cl sely connect d with, the ystem of tra es [paths] requ d to be emembe d, we k ep it well fed so that the traces a e p eserved with the utmost delicacy

This is perhaps as near as we can get to an explanation Setting the mind to remember a thing involves a continual minimal irradiation of excitement into paths which lead thereto involves the continued presence of the thing in the fringe of our consciousness Letting the thing go involves withdrawal of the irradiation unconsciousness of the thing and after a time obliterat on of the paths

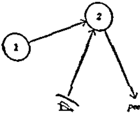


Fig. 46

A curious peculiarity of our memory is that things are impressed better by active than by passive repetition I mean that in learning by heart (for example) when we almost know the piece it pays better to wait and recollect by an effort from within than to look at the book again If we recover the wo ds in the former way we hall probably know them the next time if in the latter way we shall very likely need the book once more The learnin by heart means the for mation of paths from a former set to a later set of cerebral word processes call 1 and 2 in the diagram the processes in question then when we remember by inward effort, the path is formed by discharge from 1 to 2 just as it will after

Mind ii, p. 449

those of any other objects [1] Organization means numerous associations and the more numerous the associations the greater the number of paths of recall For the same reason adjectives conjunctions, prepositions and the cardinal verbs those words in short which form the grammatical framework of all our speech are the very last to decay Kussmaul[2] makes the following acute remark on this subject

> The concreter a conception is the sooner is its name forgotten This is because our ideas of persons and things are less strongly bound up with their names than with such abstractions as their business their circumstance [illegible] can imagine persons and th [illegible] eing [illegible] s on [illegible]

[illegible] The disease called Aphasia of which a little was said in Chapter II has let in a flood of light on the phenomenon of Memory by showing the number of ways in which the use of a given object like a word may be lo[illegible] the mind We may lose our acoustic idea [illegible] without the other [illegible] but have lost the [illegible] brain centres which support the two we are in as bad a plight Ataxic and amnesic aphasia word deafn[illegible] and associative aphasia are all [illegible] [illegible] us as M [illegible] the mus [illegible] independently of each other in the [illegible] dividual and different individuals may have them developed in different degrees As a rule a man s memory is good in the departments in which his interest is strong but those departments are apt to be th[illegible] criminative sensibilit [illegible]

[illegible] trations of the differences in men s [illegible] power It is obvious that the machinery of memory must be largely determined thereby

Mr Galton in [illegible] has given a very interesting collation of [illegible] ype of memory [illegible] acts and figures [illegible] ist be rationally [illegible] [4]

There is an interesting fact connected with remembering which so far as I know Mr R Verdon was the first writer expressly to call attention to We can

[1] Cf A Maury Le S mm il t les Rêves p 442
[2] Storung n d Sp che [illegible]
[3] [illegible] how to ha[illegible] r with their relations to [illegible] the [illegible] nd to th[illegible] (A Maury Le S mm il et les Rêves p 443) [3] Pp 107 21
[4] For other examples see Hamilton s Lect es II p 219 and A. Huber Das G dächtn s p 36 ff

ory Consciousness k
enc f nerv us imj
pres ions or p ocesses
same inexplicable act f memory It is a f ct of con
e a d f recorded and cumulati e human knowledge is depend
mear with a claim to stand

similar
act f memory it s this which makes th
persi tence r r currence f imilar impres ons It is this which makes c nscious
memory a spiritual phen menon th explanati n of which as arising out of nervous
p ocesses and conditions is n t simply undisco ered in fact but utterly incapable of
app oach by the im k f a physical basis of memory
rec gnitio must be
p oces which can l
actus f the mind,
of memory

This passa e seems to me characteristic of the reigning half way modes of thought. It puts the difficulties in the wrong places At one moment it seems to admit with the cruder sensationalists that the material of our thoughts is independent sensations reproduced and that the putting together of these sensa tions would be knowledge, if it could only be brought about the only mystery bein as to what *actus* can bring it about At another moment it seems to contend that even this sort of combining' would not be knowledge because certain of the elements connected must claim to represent or stand for past originals wh ch is incompatible with their being mere images revived The result is various confused and scattered mysteries and unsatisfied intellectual desires But why not pool our mysteries into one great my tery the mystery that brain p ocesses occa ion knowledge at all? It is surely no different mystery to *feel* myself by means of one brain process writing at this table now and by means of a different brain process a year hence to *remember* myself writing All that psychol gy can do is to seek to determine *what* the several brain processes are and thi in a wretchedly imperfect way is what such writings as the p esent chapter ha e begun to do But of images reproduced, and claiming to ep esent nd "put together by a unifying *actus* I have been silent because such exp ess ons either signify nothin or they are only roundabout ways f simply sayin that the *past is known* when certain brain-conditions are ful filled and t seems to me that the straightest and shortest way of saying that is the best

For a history of opinion about Memory and other bibliographic references I must refer to the admirable little monograph on the ubject by Mr W H Burnham in the *America Journal of Psychology* vols i and ii Useful books are D Kay s *Memory What It Is and How to Improve It* (1888) and F Fauth s *Das G dacht ss Studie u einer Padagogik etc* (1888)

Why not say "know"?

wards be used But when we excite 2 by the eye although the path 1—2 doubt less is then shot through also the phenomenon which we are discussing shows that the direct discharge from 1 into 2 unaided by the eyes ploughs the deeper and more permanent groove There is moreover a greater amount of tension accumulated in the brain before the discharge from 1 to 2 when the latter takes place unaided by the eye This is proved by the general feeling of strain in the effort to remember 2 and this also ought to make the discharge more viol t and the path more deep A sim l

l which are communicated to us from without

A word in closing about the metaphysics involved in remembering According to the assumptions of this book thoughts accompany the brain s workings and those thoughts are cognitive of realities The whole relation is one which we can only write down empirically confessing that no glimmer of explanation of it is yet in sight That brains should give rise to a knowing consciousness at all this is the one mystery which returns no matter of what sort the consciousness and of what sort the knowledge may be Sensations aware of mere qualities i volve the mystery as much th

ess is quite the reverse and the mystery of it is unspeakable Professor Ladd for example in his usually excellent book[1] after well showing the matter of fact dependence of retention and reproduction on brain paths, says

In the study of perception psycho physics *can* do much towards a scientific explana tion It can tell what qualities of stimuli produce certain qualities of sensations it can suggest a principle relating the quantity of the stimuli to the intensity of the sensation it can investigate the laws under which by combined action of various excitations the *sensations are combined* [?] into presentations of sense it can show how the time relations of the sensations and percepts in consciousness correspond to the objective relations in time of the stimulations But for that spiritual activity which actually *puts together* in consciousness the sensations it cannot even suggest the beginning of a physical explanation Moreover no cerebral process can be con ceived of which—in case it were known to exist—could possibly be regarded as a fitting basis for this unifying *actus* of mind Thus also and even more emphatically must we insist upon the complete inab

image of a percept I had a moment since or this image of memory is the image of the percept I had at a certain time—*I do not re member precisely how long since* It would then be quite contrary to the facts to hold that when an image of memory appears in consciousness it is reco nized as belonging to a particular original percept on account of its perceived resemblance to this percept The original percept does not exist and will never be *reproduced* Even more palpably false and absurd would it be to hold that any similarity of the impres sions or processes in end organs or central organs explains the act of conscious mem

[1] *Physiological Psychology* pt. II chap X, § 23

is that of mere *acquaintance* with a fact. Perception's function, on the other hand, is knowledge *about* a fact; and this knowledge admits of numberless degrees of complication. But in both sensation and perception we perceive the fact as an *immediately present outward reality*, and this makes them differ from thought and conception, whose objects do not appear present in this immediate physical way. *From the physiological point of view both sensations and perceptions differ from 'thoughts'* (in the narrower sense of the word) *in the fact that nerve-currents coming in from the periphery are involved in their production. In perception these nerve-currents arouse voluminous associative or reproductive processes in the cortex; but when sensation occurs alone, or with a minimum of perception, the accompanying reproductive processes are at a minimum too.*

I shall in this chapter discuss some general questions more especially relative to Sensation. In a later chapter perception will take its turn. I shall entirely pass by the classification and natural history of our special "sensations," such matters finding their proper place, and being sufficiently well treated, in all the physiological books.

The Cognitive Function of Sensation

A pure sensation is an abstraction; and when we adults talk of our 'sensations' we mean one of two things: either certain *objects*, namely simple *qualities* or *attributes* like *hard, hot, pain*; or else those of our thoughts in which acquaintance with these objects is least combined with knowledge about the relations of them to other things. As we can only think or talk about the relations of objects with which we have *acquaintance already*, we are forced to postulate a function in our thought whereby we first become aware of the *bare immediate natures* by which our several objects are distinguished. This function is sensation. And just as logicians always point out the distinction between substantive terms of discourse and relations found to obtain between them, so psychologists, as a rule, are ready to admit this function, of the vision of the terms or matters meant, as something distinct from the knowledge about them and of their relations *inter se*. Thought with the former function is sensational, with the latter intellectual. Our earliest thoughts are almost exclusively sensational. They merely give us a set of *thats*, or *its*, of subjects of discourse, with their relations not brought out. The first time we see *light*, in Condillac's phrase we *are* it rather than see it. But all our later optical

in a certain green means merely that when green is contrasted with these other colors he sees relations of *similarity*. He who sees abstract 'color' in it means merely that he sees similarity between it and all the other objects known as colors. (Similarity itself cannot ultimately be accounted for by an identical abstract element buried in all the similars, as has been already shown, p. 3[illegible].) He who sees abstract paleness, intensity, purity in the green means other similarities still. These are all outward determinations of that special green, knowledges about it, zur[illegible] *Anschten*, as Herbart would say, not elements of its composition. Compare the article by Meinong in the *Vierteljahrsschrift für wiss. Phil.*, XII, p. 324.

See above, p. 144.

Those who wish a fuller treatment than Martin's *Human Body* affords may be recommended to Bernstein's *Five Senses of Man*, in the International Scientific Series, or to Ladd's or Wundt's *Physiological Psychology*. The completest compendium is L. Hermann's *Handbuch der Physiologie*, vol. III.

Chapter XVII

SENSATION

AFTER inner perception outer perception! The next three chapters will treat of the processes by which we cognize at all times the present world of space and the material things which it contains And first of the process called Sensation

Sensation and Perception Distinguished

The words Sensation and P

p ocesses in which we cognize an objec t e world both (under normal conditions) need the stimulation of incoming nerve currents ere they can occur Perception always involves Sensation as a portion of itself and Sensation in turn never takes place in adult life without Perception also being there They are therefore names for different cognitive *functions* not for different sorts of mental *fact* The nearer the object cognized comes to being a simple quality like hot cold red noise pain apprehended irrelatively to other things the more the state of mind approaches pure sensation The fuller of relations the object is on the contrary the more it is something classed located measured compared assigned to a *function* etc etc the more unreservedly do we call the state of mind a perception and the relatively smaller is the part in it which sensation plays

Sensation then so long as we take the analytic point of view differs from Perception only in the extreme simplicity of its object or content [1] Its function

[1] Some persons will say that we never have a really s mple object or content My definition of sensation does not require the simplicity to be absolutely but only relati ely extreme It is worth while in passing however to warn the reader against a couple of inferences that are often made One is that because we gradually learn to analyze so many qualities we ought to conclude that there are no really indecomposable feelings in the mind. The other is that because the processes that produce our sensations are multiple the sensations regarded as subj ctive f cts must also be compound T take an ex mple to a child the taste of lemonade comes at first as a simple quality H later learns both that many stimuli and many ne ves are involved in the exhibition of this taste to hi m nd and he also learns to perceive separately the sourness th cool ss the sweet the l m n aroma etc and the several degrees of strength of each and all of these things,—the experience fall ing into a large numb r of aspects each f which is abstracted classed n med etc and all of wh ch appe r to be the lementary sensations into which the orig n l l m ade flavor is decomposed It is argued fr m this th t the l tter n e was th simple thin whi h it seemed I have already criticised this sort of reasoning in Chapter vi (see p 112 ff) The mind f the hild enjoy ng the simple l m nade flavo and that f the same h ld grow up and analy ng it are in two ent r ly different cond tion Subjecti ly c sidered th tw stat s of mind are two alt ther dist nct sorts of fact The later m ntal st te sa this is the same *flavo* (r *flu d*) which that n ' s not m e c n s o xample He who sees blue and y llow

how can it be known *cum alio* or brought into one view with anything else This pocket knows nothing else no other part of the mind knows toothache The knowing of toothache *cum alio* must be a miracle. And the miracle must have an Agent And the Agent must be a Subject or Ego out of time —and all the rest of it as we saw in Chapter x And then begins the well worn round of recrimination between the sensationalists and the spiritualists from which we are saved by our determination from the outset to accept the psychological point of view and to admit knowledge whether of simple toothaches or of philosophic systems as an ultimate fact There are realities and there are states of mind and the latter know the former and it is just as wonderful for a state of mind to be a sensation and know a simple pain as for it to be a thought and know a system of related things But there is no reason to suppose that when different states of mind know different things about the same toothache they do so by virtue of their all *containing* faintly or vividly the original pain Quite the reverse The by gone sensation of my gout was painful as Reid somewhere says the *thought* of the same gout as by gone is pleasant and in no respect resembles the earlier mental state

Sensations, then first make us acquainted with innumerable things and then are replaced by thoughts which know the same things in altogether other ways And Locke s main doctrine remains eternally true however hazy some of his language may have been that

> though there be a gr t number of considerations whe ein things may be compa ed one with anothe and so a multitude of relations yet they all *terminate in* and are erned about, th se simpl deas either of sensation or reflectio which I think t be the wh le materials of all our knowl d. The simple ideas we recei e f om sensati n and eflection e the *b undaries* of ur th ughts beyond which, th mind whatever efforts t would mak is n t bl t ad ance on j t or can it make any dis o eries when it w uld pry into the nature and hidden causes f those deas.

The nature and hidden causes of ideas will never be unravelled till the *nexus* between the brain and consciousness is cleared up All we can say now is that sensations are *first* things in the way of consciousness Before conceptions can come sensations must ha e come but before sensations come no psychic fact need have existed a nerve-current is enough If the nerve-current be not given nothing else will take its place To quote the good Locke again

true disunct n tions of sounds.

1

By simple ideas f sensatio Locke me y means sensations.
Essay H man L de s nding bk. ii, ch. xxiii, § 9 ch xxv § 9.
Op cit bk. ii, ch. ii, §

knowledge is about what this experience gives And though we were struck blind from that first moment our scholarship in the subject would lack no essential feature so long as our memory remained In training institutions for the blind they teach the pupils as much *about* light as in ordinary schools. Reflection refraction the spectrum the ether theory etc are ... But the best taught born blind ... know ...

... e usually find sensa ... nt of experience even by those philosophers who are least inclined to make much of its importance or to pay respect to the knowledge which it brings [1]

But the trouble is that most, if not all of those who admit it admit it as a fractional *part* of the thought in the old fashioned atomistic sense which we have so often criticised

Take the pain called toothache for example Again and again we feel it and greet it as the same real item in the universe We must therefore it is supposed have a distinct pocket for it in our mind into which it and nothing else will fit This pocket when filled is the sensation of toothache and must be either filled or half filled whenever and under whatever form toothache is present to our thought and whether much or little of the rest of the mind be filled at the same time Thereupon of course comes up the paradox and mystery If the knowledge of toothache be pent up in this separate mental pocket

[1] The sensations which we *postulate* as the signs or occasions of our perception. (A. Seth *Scottish Philosophy* p 89) Their existence is *supposed* only because without them it would be impossible to account for the complex phenomena which are directly present in consciousness (J Dewey *Psychology* p 34) Even as great an enemy of Sensation as T H Green has to allow it a sort of hypothetical existence under protest Percepts n presuppose feeling (*Contemp Review* vol xxxi, p 747) *Cf* also such passages as those in his *Prolegomena to Ethics* §§ 48 49 —Physiologically the sensory and the reproductive or associative processes may wax and wane independently of each other Where the part directly due to stimulation of the sense organ preponderate the thought has a sensational character and differs from other thoughts in the sensational direction Those thoughts which lie farthest in that direction we call *sensations* for practical convenience just as we call conceptions those which lie nearer the opposite extreme But we no more have conceptions pure than we have pure sensations Our most rarefied intellectual states involve some bodily sensibility just as our dullest feelings have some intellectual scope Common sense and common psychology express this by saying that the mental state is composed of distinct fractional parts one of which is sensation the other conception We who believe every mental state to be an integral thing (p 178) cannot talk thus but must speak of the degree of sensational or intellectual character or function of the mental state of ... Hering puts as usual his finger better upon the truth than any one else Writing ... perception he says It is in admissible in the present state of our knowledge to assert that first and last the same retinal picture arouses exactly the same pure sensation but that this sensation in consequence of practice and experience is differently ... last time and elaborated ... n the ... nd n the ... —and that ... y a pure ... the ... knowing ... can ... hypothesis only ... the ... apparent ... the same stimulus ... the last time from the first ... consequence the consciousness ... too (Hermann's *Handbuch* iii 1 p 567–68)

much in the infant s lowest sensation as in the highest achievement of a Newton s brain The physiological condition of this first sensible experience is probably nerve currents coming in from many peripheral organs at once Later the one confused Fact which these currents cause to appear is perceived to be many facts and to contain many qualities For as the currents vary and the brain paths are moulded by them other thoughts with other objects come and the same thing which was apprehended as a present *this* soon figures as a past *that* about which many unsuspected things have come to light The principles of this development have been laid down already in Chapters XII and XIII and nothing more need here be added to that account

The Relativity of Knowledge

To the reader who is tired of so much *Erkenntnisstheorie* I can only say that I am so myself but that it is indispensable in the actual state of opinions about Sensation to try to clear up just what the word means Locke s pupils seek to do the impossible with sensations and against them we must once again insist that sensations clustered together cannot build up our more intellectual states of mind Plato s earlier pupils used to admit Sensation s existence grudgingly but they trampled it in the dust as something corporeal non cognitive and vile His latest followers seem to seek to crowd it out of

The brain is so made that all currents in it run one way Consciousness of some sort goes with all the currents but it is only when new currents are entering that it has the sensational *tang* And it is only then that consciousness directly *encounters* (to use a word of Mr Bradley's) a reality outside itself

The difference between such encounter and all conceptual knowledge is very great A blind man may know all *about* the sky's blueness and I may know all *about* your toothache conceptually tracing their causes from primeval chaos and their consequences to the crack of doom But so long as he has not felt the blueness nor I the toothache our knowledge wide as it is of these realities will be hollow and in ... must *feel* blueness some- ... edge of these matters real ... off in sensations would be ... st plunge themselves into ... Sensations are the stable ... *quo* and the *terminus ad quem* of thought To find such termini is our aim with all our theories—to conceive first when and where a certain sensation may be had and then to have it Finding it stops discussion Failure to find it kills the false conceit of knowledge Only ... a possible sensation fo...

... *of life* Th...

bu...

Prior ...

consci ... the first weeks after birth are passed in almost unbroken sleep by human infants It takes a strong message from the sense organs to break this slumber In a new born brain this gives rise to an absolutely pure sensation But the experience leaves its unimaginable touch on the matter of the convolutions and the next impression which a sense organ transmits produces a cerebral reaction in which the awakened vestige of the last impression plays its part Another sort of ... higher grade of cognition ...

... ing exactly the same (See above ... 49 ...)

The first sensation which an infant gets is for him the Universe And the Universe which he later comes to know is nothing but an ampl... an implication of that first ...

... (or something for which even the ... is would perhaps be too discriminative and the intellectual acknowledgment of which would be better expressed by the bare interjection lo!) the infant encounters an object in which (though it be given in a pure sensation) all the categories of the understanding are contained *It has objectivity unity substantiality causality in the full sense in which any later object or system of objects has these things* Here the young knower meets and greets his world and the miracle of knowledge bursts forth as Voltaire says as

only understood it, they would see to be identical with Professor Green's doctrine. They tell us that the relation of sensations to each other is something belonging to their essence, and that no one of them has an absolute content:

"That, e.g., black can only be felt in contrast to white, or at least in distinction from a paler or a deeper black; similarly a tone or sound only in alternation with others or with silence; and in like manner a smell, a taste, a touch, only, so to speak, *in statu nascendi*, whilst, when the stimulus continues, all sensation disappears. This all seems at first sight to be splendidly consistent both with itself and with the facts. But looked at more closely, it is seen that neither is the case."

The two leading facts from which the doctrine of universal relativity derives its wide-spread credit are these:

1) The *psychological fact* that so much of our actual knowledge is of the relations of things—even our simplest sensations in adult life are habitually referred to classes as we take them in; and

2) The *physiological fact* that our senses and brain must have periods of change and repose, else we cease to feel and think.

Neither of these facts proves anything about the presence or non-presence to our mind of absolute qualities with which we become sensibly acquainted. Surely not the psychological fact; for our inveterate love of relating and comparing things does not alter the intrinsic qualities or nature of the things compared, or undo their absolute givenness. And surely not the physiological fact; for the length of time during which we can feel or attend to a quality is altogether irrelevant to the intrinsic constitution of the quality felt. The time, moreover, is long enough in many instances, as sufferers from neuralgia know. And the doctrine of relativity not proved by these facts is flatly disproved by other facts even more patent. So far are we from not knowing (in the words of Professor Bain) "any one thing by itself, but only the difference between it and another thing," that if this were true the whole edifice of our knowledge would collapse. If all we felt were the *difference* between the *C* and *D*, or *c* and *d*, on the musical scale, that being the same in the two pairs of notes, the pairs themselves would be the same, and language could get along without substantives. But Professor Bain does not mean seriously what he says, and we need spend no more time on this vague and popular form of the doctrine. The facts which seem to hover before the minds of its champions are those which are best described under the head of a physiological law

Stumpf: *Tonpsych.* I, pp. 7–8. Hobbes's phrase, *sentire semper idem et non sentire* ..., is generally treated as the original statement of the relativity doctrine. J. Mill (*Analysis of H. Mind*, p. 6) and Bain (*The Senses and the Intellect*, p. 3; *The Emotions and the Will*, p. ...; *Logic*, I, p. ...; *Body and Mind*, p. 8...) are subscribers to this doctrine. *Cf.* also J. Mill's *Analysis*, J. S. Mill's edition, II, pp. ...

We can hardly hear a note for half an hour. The difference between the senses are marked. Smell and taste seem soon to get fatigued.

In the popular mind it is mixed up with that entirely different doctrine of the Relativity of Knowledge preached by Hamilton and Spencer. This doctrine says that our knowledge is relative, as and is not of the object as the latter is in itself. It has nothing to do with the question, which we have been discussing, of whether our objects of knowledge contain absolute terms or consist altogether of relations.

existence altogether The only reals for the neo-Hegelian writers appear to be *relations* relations without terms or whose terms are only speciously such and really consist in knots or gnarls of relation

u not exist at all [1] The single feeling

real On the recognition of relations as constituting the *nature* of ideas rests the possibility of any tenable theory of their reality [2]

Such quotations as these from the late T H Green would be matters of curiosity rather than of importance were it not that sensationalist writers themselves believe in a so called Relativity of Knowledge which if they

says knowledges Etc etc., etc. (R Cudworth *Treatise Concerning Eternal and Immutable Morality* bk III chap II) Similarly Malebranche's Th d knows pain pleasure warmth

s not to feel it ARISTE —That is true s to know it is it not? THÉODORE —No indeed since God does not feel it in the least and yet he knows it perfectly But in order not to quibble about terms if you will have it that to feel pain is to know it agree at least that it is not to know it clearly that it is not to know it by light and by evidence—in a word ow its nature in other words nd

ey shed The ey appear to ut to lead us astray (*Entretiens sur la méta physique 3me Entretien ad init*) Malebranche's Théodore prudently does not try to explain how God's infinite felicity is compatible with his not feeling joy

[1] Green *Prolegomena* §§ 20 28

[2] Green *Introd to Hume* §§ 146 188 It is hard to tell just what this apostolic human being but strenuously feeble tion Sometimes it seems to stand for a lo ist's fallacy (see p 128) in his pages, thin know n th thought that k o it bout that thought by later and addition Compare however with the utterances con from the sleep of s nso ithin th crystal sphere of intelli n e is to sense is nothing for thought The re can there be no reality n rs as th Th which the world of thought can be referred

h a phrase th present as no place in the w perie (*Prolegomena to Ethics* §§ 46 50)—I have expressed myself a little more fully on this subject in *Mind* x p 27 ff

The phenomena o ht are so complicated by other attendant phen in their purity Yet would conduct his investigations accurately Neglect of th p r many mistakes being r for the facts observed As we have seen if the eye is ordinarily does suc its presence It can eye a po nt of one field and by then observing the chang this field when the contrasting field is placed by its side Such a course will insure pure simultaneous contrast But even thus it lasts in its purity for a moment only It reaches its maximum of effect immediately after the introduction of the contrastı h fixation is continued it begins to weaken rap dly and those observed when ar comes fatigued by unchanging st muli If one continues still further the field tend to spread themselves ov sul

of temporal changes due to fixation and of sim ing the phenomena of simultaneous contrast but we must also take into account *var ous other influences which modify its effects* Under favorable circumstances the contr ry striking and did they always occur as strongly they coul clea ly appare t ow t the laws of contras When for instance the ground observed has many distinguishable features—a *coarse gra n rough surface intricate pattern* etc—the contrast effect appears weaker This does not imply that the effects of contrast are absent but merely that the resulti g sensations are overpowered by the many other stronger sensat ons wh ch entirely occupy the attention On such a ground a fai t n gative after image—undoubtedly due to retinal mod fications—may become nvis ble and even weak objective differences in color may become mpercept ble For example a faint spot or grease stain on woollen cloth easily seen at a d stance when the fibres are not distinguishable disappears when clo er e am nation reveals the intr cate nature of the surface

A other freq ent cause of the apparent absence of contrast is the presence of narrow dark intermed ate fields such as are formed by *bordering a field*

t ast h is sh in the f t th t w m se t ppe w rm f ld has j t p ly be xp d and ld ld f th p di was w rm If fi h h h her l d h t w t d th wh h has b ld w te

The Law of Contrast

I will first enumerate the main facts which fall under this law and then remark upon what seems to me their significance for psychology [1]

[Nowhere are the phenomena of contrast better exhibited and their laws more open to accurate study than in connection with the sense of sight Here both kinds—simultaneous and successive—can easily be observed for they are of constant occurrence Ordinarily they remain unnoticed in accordance with the general law of economy which causes us to select for conscious notice only such elements of our object as will serve us for æsthetic or practical utility and to neglect the rest just as we ignore the double images the *mouches volantes* etc which exist for everyone but which are not discriminated without careful attention But by attention we may easily discover the general facts involved in contrast We find that *in general the color and brightness of one object always apparently affect the color and brightness of any other object seen simultaneously with it or immediately after*

In the first place if we look for a moment at any surface and then turn our eyes elsewhere the complementary color and opposite degree of brightness to that of the first surface tend to mingle themselves with the color and the brightness of the second This is *successive contrast* It finds its explanation in the fatigue of the organ of sight causing it to respond to any particular stimulus less and less readily the longer such stimulus continues to act This is shown clearly in the very marked changes which occur in case of continued fixation of one particular point of any field The field darkens slowly, becomes more and more indistinct and finally if one is practised enough in holding the eye perfectly steady slight differences in shade and color may entirely disappear If we now turn aside the eyes a negative after image of the field just fixated at once forms and mingles its sensations with those which may happen to come from anything else looked at This influence is distinctly evident only when the first surface has been fixated without movement of the eyes It is however none the less present at all times even when the eye wanders from point to point causing each sensation to be modified more or less by that just previously experienced On this account successive contrast is almost sure to be present in cases of simultaneous contrast and to complicate the phenomena

A *visual image is modified not only by other sensations just previously experienced but also by all those experienced simultaneously with it and especially by such as proceed from contiguous portions of the retina* This is the phenomenon of *simultaneous contrast* In this as in successive contrast both brightness and hue are involved A bright object appears still brighter when its surroundings are darker than itself and darker when they are brighter than itself Two colors side by side are apparently changed by the admixture with each of the complement of the other And lastly a gray surface near a colored one is tinged with the complement of the latter [2]

[1] What follows in brackets as far as p 468 is from the pen of my friend and pupil Mr E B Delabarre

[2] These phenomena have close analogues in the phenomena of contrast presented by the temperature sense (see W Preyer in *Arch v f d ges Phys* vol xxv p 79 ff) Successive

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the c ring and what t the je t.
also whe e th co ering over the obje t is *not* at all color d, because of the decepti n into which we fall and in o seq ence of which we ascribe to the body a false color the color complementary to the c lor d portion of the co ering [1]

We think that we see the complementary color through the colored cover ing—for these two colors to ether would gi e the sensation of white which is actually experienced If ho ever in any way the white spot is recognized as an independ nt object or if it is compared with another object known to be white our judgment is no longer deceived and the contrast does not appear

As soo as the co trasting field is recognized as an independent body which lies bove the ol red ground or even th ough an adequ te *tracing of its outlines is seen* t be separat field the c trast disappears Since then the judgment f the patial positi n th material independenc of the object in questi n is decis e f r the deter minati n f ts l r t follows that the co tra t-colo arises not th ough an ct of sensati but thr ugh an ct of j dgment.

In short the apparent change in color or brightness throu h contrast is due to no change in excitation of the organ to no change in sensation but in con sequence of a false judgment the unchanged sensation is wrongly interpreted and thus leads to a chan ed *percept on* of the brightness or color

In opposition to this theory has been developed one which attempts to ex plain all cases of contrast as dependin purely on *physiological action of the tern nal appa atus f i sio He ing s the most prominent supporter of th s* er By great originality in devising experiments and by insisting on r gid care in c nducting them he has been able to detect the faults in the psycho logical theory and to practically establish the validity of his own Every vi ual sensat n he maintains is correlated to a phys cal process in the nervous ap paratus Contrast is occas oned not by a false idea resulting from unconscious co clus ons but by the fact that the exc tation of any portion of the retina—and the onsequent sensation—depends not only on its own illumination but n that of the rest of the retina as well

If this psych physical p oces is a ou ed as usually happens by light rays imping ing th retina, is natur depends t only on the natur of these ay but Is on

[1] *Loc cit* p 403 *Loc cit* p 406

with black lines or by the shaded contours of objects When such fields interfere with the contrast it is because black and white can absorb much color without themselves becoming clearly colored and [illegible] separate other fields too far fo[illegible] n weak

[illegible] early appear is where the *color of the* [illegible] *ng fields is too weak or too intense* or where there is *much difference in brightness between the two fields* In the latter case as can easily be shown it is the contrast of brightness which interferes with the color contrast and makes it imperceptible For this reason contrast shows best between fields of about equal brightness But the intensity of the color must not be too great for then its very darkness necessitates a dark contrasting field which is too absorbent of induced color to allow the contrast to appear strongly The case is similar if the fields are too light

To obtain the best contrast effects therefore the contrasting fields should be near together should not be separated by shadows or black lines sh[illegible] of homogeneous texture and should be [illegible] *intensity of* [illegible] influences be[illegible]

[illegible] will be explained in comparing [illegible]

There are *two theories—the psychological and the physiological*—which attempt to explain the phenomena of contrast

Of these the *psychological one* was the first to gain prominence *Its most able advocate has been Helmholtz It explains contrast as a* DECEPTION OF JUDGMENT In ordinary life our sensations have interest for us only so far as they give us practical knowledge Our chief concern is to recognize objects and we have no occasion to estimate exactly their absolute brightness and color Hence we gain no facility in so doing but neglect the constant changes in their shade and are very uncertain as to the exact degree of their brightness or tone of their color When objects are near one another we are inclined to consider those differences which are clearly and surely perceived as greater than those which appear uncertain in perception or which must be judged by aid of memory [1] just as we see a medium sized man taller th[illegible]n [illegible] when he stands beside a sho[illegible]

[illegible] trast [illegible] face— [illegible] iment colored shadows etc soon to be described—the contrast is produced according to Helmholtz by the fact that a colored illumination or a transparent colored covering appears to be spread out over the field and observation does not show directly that it fails on the white spot [2] We therefore believe that we see the latter through the former color Now

[1] Helmholtz *Physiolog Optik* p 392 [2] *Loc cit* p 407

to this cause. *In all the cases which one may investigate it will be seen that the upholders of the psychological theory have failed to conduct their experiments with sufficient care.* They have not excluded successive contrast, have overlooked the changes due to steady fixation and have failed to properly account for the various modifying influences which have been mentioned above. We can easily establish this if we examine the most striking experiments in simultaneous contrast.

Of these one of the best known and most easily arranged is that known as *Meyer's experiment*. A scrap of gray paper is placed on a colored background and both are covered by a sheet of transparent white paper. The gray spot then assumes a contrast-color complementary to that of the background which shines with a whitish tinge through the paper which covers it. Helmholtz explains the phenomenon thus:

If the background is green, the covering paper itself appears to be of greenish color. If the substance of the paper extends without apparent interruption over the gray which lies under it, we think that we see an object glimmering through the greenish paper and such an object must in turn be rose-red, in order to give white light. If however the gray spot has its limits so fixed that it appears to be an independent object, the continuity with the greenish portion of the surface fails, and we regard it as a gray object which lies on this surface.

The contrast-color may thus be made to disappear by tracing in black the outlines of the gray scrap or by placing above the tissue paper another gray scrap of the same degree of brightness and comparing together the two grays. On neither of them does the contrast-color now appear.

Hering[2] shows clearly that this interpretation is incorrect, and that the disturbing factors are to be otherwise explained. In the first place the experiment can be so arranged that we could not possibly be deceived into believing that we see the gray through a colored medium. Out of a sheet of gray paper cut strips 5 mm. wide in such a way that there will be alternately an empty space and a bar of gray, both of the same width, the bars being held together by the uncut edges of the gray sheet (thus presenting an appearance like a gridiron). Lay this on a colored background—e.g., green—cover both with transparent paper and above all put a black frame which covers all the edges, leaving visible only the bars which are now alternately green and gray. The gray bars appear strongly colored by contrast although since they occupy as much space as the green bars we are not deceived into believing that we see the former through a green medium. The same is true if we weave together into a basket pattern narrow strips of green and gray and cover them with the transparent paper.

Why then, if it is a true sensation due to physiological causes, and not an error of judgment, which causes the contrast, does the color disappear when the outlines of the gray scrap are traced, enabling us to recognize it as an independent object? In the first place it does not necessarily do so, as will easily be seen if the experiment is tried. The contrast-color often remains distinctly visible in spite of the black outlines. In the second place there are many adequate reasons why the effect should be modified. Simultaneous contrast is always strongest at the border line of the two fields, but a narrow black field

[1] Helmholtz, Physiolog. Optik, p. 407. [2] In Archiv f. d. ges. Physiol., vol. XLI, 3 ff.

the constitution of the entire nervous apparatus which is connected with the organ of vision and on the state in which it finds itself [1]

When a limited portion of the retina is aroused by external stimuli the rest of the retina and especially the immediately contiguous parts tends to react also and in such a way as to produce therefrom the sensation of the opposite degree of brightness and the complementary color to that of the directly excited portion When a gray spot is seen alone and again when it appears colored through contrast the objective light from the spot is in both cases the same Helmholtz maintains that the neural process and the corresponding *sensation* also remain unchanged but are differently *interp* [illegible] ing that the neural process [illegible] that the [illegible] al condi

[illegible]

contrast color is no [illegible]

features on a field [illegible] aced with black lines etc —the psychological theory as we have seen attributes this to the fact that under these circumstances we judge the smaller patch of color to be an independent object on the surface and are no longer deceived in judging it to be someth [illegible] which the color of the ground [illegible]

[illegible]

The two theories stated thus broadly may seem equally plausible Hering, however has conclusively proved by experiments with after images that the process on one part of the retina does modify that on neighboring portions under conditions where deception of judgment is impossible [2] A careful examination of the facts of contrast will show that its phenomena must be due

[1] E Hering in Hermann s *Handbuch d Physiologie* iii 1 p 565

[2] Hering *Zur Lehre vom Lichtsinne* —Of these experiments the following (found on p 24 ff) may be cited as a typical one From dark gray paper cut two strips 3 4 cm long and ½ cm wide and lay them on a background of which one half is wh [illegible] deep black, in such a w [illegible]

[illegible] s in t the different brightn ss [illegible] after ima es of the strips must have its ground in a different state of e citat on of the c [illegible] pond ing port ons of the ret na a d from this f llows further that both these po ti [illegible] were diff rently stimulat d during the original observ [illegible] for the differ [illegible] de mands here a different fore effect In th orig nal arrang ment the bj cti ly sim lar strips appeared of different brightness, because both correspondin portions of th retina were truly differently [illegible] cited.

The difference of the compar ... ally is either because this difference when it is al ne makes a stronger impres... different color of the surface a... the surface such as might arise ... o through mixture with col red paint or dust. In truth, to pr duce an ... gray spot on a green surface a eddish coloring would be necessary

This explanation is easily proved false by painting the disk with narrow green and gray concentric rings and giving each a different saturation The contrast appears though there is no ground-color and no lon er a single dif ference but many The facts which Helmholtz brings forward in support of his theory are also easily turned against him. He asserts that if the color of the ground is too intense or if the gray ring is bordered by black circles the contrast becomes weaker that no contrast appears on a white scrap held over t ... when compared with such scrap loses

...

ance through increasing brightness-contrast is to be avoided ... gray field on which contrast-colors are less easily perceived and careful use of the white scrap leads to entirely different results The contrast-color does appear upon it when it is first placed above the colored field but if it is carefully fixated the contrast-color diminishes very rapidly both on it and on the ring from causes already explained To secure accurate observation all complication through successive contrast should be avoided thus first arrange the white scrap then interpose a gray screen between it and the disk, rest the eye set the wheel in motion fixate the scrap and then have the screen removed The contrast at once appears clearly and its disappearance through continued fixation can be accurately watched

Brief mention of a few other cases of contrast must suffice The so-called mirror experiment consists of placing at an angle of 45 a green (or otherwise colored) pane of glass, forming an angle with two white surfaces one horizontal and the other vertical. On each white surface is a black spot The one on the horizontal surface is seen through the glass and appears dark green the other is reflected from the surface of the glass to the eye and appears by contrast red The experiment may be so arranged that we are not aware of the presence of the green glass but think that we are looking directly at a surface with green and red spots upon it in such a case there is no deception of judgment caused by making allowance for the colored medium through which we think that we see the spot and therefore the psychological explanation does not apply On excluding successive contrast by fixation the contrast soon disappears as in all similar experiments

Colored shadows have long been thought to afford a convincing proof of the fact that simultaneous contrast is psychological in its origin They are formed whenever an opaque object is illuminated from two separate sides by lights

Helmholtz, *loc cit* p 4

See Hering *Archiv f. d. ges. Physiol* vol. XLI, § 358 ff

now separates the two and itself by contrast strengthens the whiteness of both original fields which were already little saturated in color and on black and on white, contrast colors show only under the most favorable circumstances Even weak objective differences in color may be made to disappear by such tracing of outlines as can be seen if we place on a gray background a scrap of faintly colored paper, cover it with transparent paper and trace its outlines. Thus we see that it is not the recognition of the contrasting field as an independent object which interferes with its color, but rather a number of entirely explicable physiological disturbances

The same may be proved in the case of holding above the tissue paper a second gray scrap and comparing it with that underneath To avoid the disturbances caused by using papers of different brightness the second scrap should be made exactly like the first by covering the same gray with the same tissue paper and carefully cutting a piece about 10 mm square out of both together To thoroughly guard against successive contrast which so easily complicates the phenomena we must carefully prevent all previous excitation of the retina by colored light This may be done by arranging thus place the sheet of tissue paper on a glass pane which rests on four supports under the paper put the first gray scrap By means of a wire fasten the second gray scrap 2 or 3 cm above the glass plate Both scraps appear exactly alike except at the edges Gaze now at both scraps with eyes not exactly accommodated so that they appear near one another, with a very narrow space between Shove now a colored field (green) underneath the glass plate and the contrast appears at once on both scraps If it appears less clearly on the upper scrap it is because of its bright and dark edges its inequalities its grain etc When the accommodation is exact there is no essential change although then on the upper scrap the bright edge on the side toward the light and the dark edge on the shadow side disturb somewhat By continued fixation the contrast becomes weaker and finally yields to simultaneous induction causing the scraps to become indistinguishable from the ground Remove the green field and both scraps become green by successive induction If the eye moves about freely these last named phenomena do not appear but the contrast continues indefinitely and becomes stronger When Helmholtz found that the contrast on the lower scrap disappeared it was evidently because he then really held the eye fixed This experiment may be disturbed by holding the upper scrap wrongly and by the differences in brightness of its edges or by other inequalities but not by that recognizing of it as an independent body lying above the colored ground on which the psychological explanation rests

In like manner the claims of the psychological explanation can be shown to be inadequate in other cases of contrast Of frequent use are revolving disks which are especially efficient in showing good contrast phenomena because all inequalities of the ground disappear and leave a perfectly homogeneous surface On a white disk are arranged colored sectors which are interrupted mid way by narrow black fields in such a way that when the disk is revolved the white becomes mixed with the color and the black forming a colored disk of weak saturation on which appears a gray ring The latter is colored by contrast with the field which surrounds it Helmholtz explains the fact thus

before the eyes In the ensuing chapters such illusions as this will be treated of in considerable detail But it is a mistake to interpret the simpler cases of contrast in the light of such illusions as these These illusions can be rectified in an instant and we then wonder how they could have been They come from insufficient attention or from the fact that the impression which we get is a sign of more than one possible object and can be interpreted in either way In none of these points do they resemble simple color-contrast which *unquestionably is a phenomenon of sensation immediately aroused*

I have dwelt upon the facts of color contrast at such great length because they form so good a text to comment on in my struggle against the view that sensations are immutable psychic things which coexist with higher mental functions Both sensationalists and intellectualists agree that such sensations exist They *fuse* say the pure sensationalists and *make* the higher mental function they *are combined* by activity of the Thinking Principle say the intellectualists I myself have contended that they *do not exist* in or alongside of the higher mental function when that exists The things which arouse them exist and the higher mental function also knows these same things But just as its knowledge of the things supersedes and displaces their knowledge, so it supersedes and displaces them when it comes being as much as they are a direct resultant of whatever momentary brain conditions may obtain The psychological theory of contrast on the other hand holds the sensations still to exist in themselves unchanged before the mind whilst the relating activity of the latter deals with them freely and settles to its own satisfaction what each shall be in view of what the others also are. Wundt says expressly that the Law of Relativity is not a law of sensation but a law of Apperception and the word Apperception connotes with him a higher intellectual spontaneity This way of taking things belongs with the philosophy that looks at the *data* of sense as something earth born and servile and the relating of them together as something spiritual and free Lo! the spirit can even change the intrinsic quality of the sensible facts themselves if by so doing it can relate them better to each other! But (apart from the difficulty of seeing how changing the sensations should relate them better) is it not manifest that the relations are part of the content of consciousness part of the object just as much as the sensations are? Why ascribe the former exclusively to the *knower* and the latter to the *known?* The *knower* is in every case a unique pulse of thought corresponding to a unique reaction of the brain upon its conditions All that the facts of contrast show us is that the *same real thing* may give us quite different sensations when the conditions alter and that we must therefore be careful which one to select as the thing's truest representative.

There are many other facts beside the phenomena of contrast which prove that *the two objects act together on us the sensation which each the would give alone becomes a different sensation* A certain amount of skin dipped in hot

Physiol. Psych I, pp. 351 458–60. The full inanity of the law of relativity is best to be seen in Wundt treatment where the great *allgemeines Gesetz der Beziehung* is invoked to account for Weber's law as well as for the phenomena of contrast and many other matters, can only be defined as tendency *of all things to relation to each other!* Bless its little soul! But why does it change the things so which it thus feels the main lati ?

of different colors When the light from one source is white, its shadow is of the color of the other light and the second shadow is of a color complementary to that of the field illuminated by both lights If now we take a tube blackened inside and through it look at the colored shadow, none of the surrounding field being visible and then have the colored light removed the shadow still appears colored although the circumstances which caused it have disappeared This is regarded by the psychologists as conclusive evidence that the color is due to deception of judgment It can however easily be shown that the persistence of the color seen through the tube is due to fatigue of the retina through the prevailing light and that when the colored light is removed the color slowly disappears as the equilibrium of the retina becomes gradually restored When successive contrast is carefully guarded against the simultaneous contrast whether seen directly or through the tube never lasts for an instant on removal of the colored field The physiological explanation applies throughout to all the phenomena presented by colored shadows [1]

If we have a small field whose illumination remains constant surrounded by a large field of changing brightness an increase or decrease in brightness of the latter results in a corresponding apparent decrease or increase respectively in the brightness of the former while the large field seems to be unchanged Exner says

> This illusion of sense shows that we are inclined to regard as constant the dominant brightness in our field of vision and hence to refer the changing difference between this and the brightness of a limited field to a change in brightness of the latter

The result however can be shown to depend not on illusion but on actual retinal changes which alter the sensation experienced The irritability of those portions of the retina lighted by the large field becomes much reduced in consequence of fatigue so that the increase in brightness becomes much less apparent than it would be without this diminution in irritability The small field however shows the change by a change in the contrast-effect induced upon it by the surrounding parts of the retina [2]

The above cases show clearly that *physiological processes and not deception of judgment are responsible for contrast of color* To say this however is not to maintain that our perception of a color is never in any degree modified by our judgment of what the particular colored thing before us may be We have unquestionable illusions of color due to wrong inferences as to what object is before us Thus Von Kries[3] speaks of wandering through evergreen forests covered with snow and thinking that through the interstices of the boughs he saw the deep blue of pine-clad mountains covered with snow and lighted by brilliant sunshine whereas what he really saw was the white snow on trees near by lying in shadow] [4]

Such a mistake as this is undoubtedly of psychological origin It is a wrong *classification* of the appearances due to the arousal of intricate processes of association amongst which is the suggestion of a different hue from that really

[1] Hering *Archiv f d ges Physiol* vol xl, § 172 ff Delabarre *American Journal of Psychology* ii p 636 [2] Hering *Archiv f d ges Physiol* vol xli § 91 ff

[3] *Die Gesichtsempfindungen u ihre Analyse* p 128

[4] Mr Delabarre's contribution ends h

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There are many other facts besides the phenomena of contrast which prove that when two objects act together on us the sensation which either alone would give becomes a different sensation. A certain amount of skin dipped in hot

[1] Physiol. Psych., I. pp. 351, 458-60. The full majesty of the Law of Relativity is best to be seen in Wundt's treatment, where the great "allgemeines Gesetz der Beziehung," invoked to account for Weber's law as well as for the phenomena of contrast and many other matters, can only be defined as tendency to feel all things in relation to each other! Bless its little soul! But why does it change the things so, when it thus feels them in relation?

water gives the perception of a certain heat More skin immersed makes the heat much more intense, although of course the water s heat is the same A certain extent as well as intensity in the quantity of the stimulus is requisite for any quality to be felt Fick and Wunderli could not distinguish heat from touch when both were applied through a hole in a card and so confined to a small part of the skin Similarly there is a *chromatic mi n* [illegible] b-jects The image they ca t on [illegible] or [illegible] and [illegible] object more extensive This happens [illegible] be shown in Chapter xix when the illumination is increased the whole room expands and dwindles according as we raise or lower the gas jet It is not easy to explain any of these results as illusions of judgment due to the inference of a wrong objective cause for the sensation which we get No more is this easy in the case of Weber s observation that a thaler laid on the skin of the forehead feels heavier when cold than when warm or of Szabadfoldi s observation that small wooden disks when heated to 122 Fahrenheit often feel heavier than those which are larger but not thus warmed [1] or of Hall s observation that a heavy point moving over the skin seems to go faster than a lighter one moving at the same rate of speed [2]

Bleuler and Lehmann some years ago called attention to a strange idiosyncrasy found in some persons and consisting in the fact that impressions on the eye skin etc were accompanied by distinct sensations of *sound* [3] *Colored hearing* is the name sometimes given to the phenomenon which has now been repeatedly described Quite lately the Viennese aurist Urbantschitsch has proved that these cases are only extreme examples of a very general law and that all our sense organs influence each other s sensations Th [illegible] of color so distant as not to b [illegible] [illegible] the acuity of vision was in [illegible] that letters too far off to be read could be read when the tuning fork was heard Urbantschitsch varying his experiments found that their results were mutual and that sounds which were on the limits of audibility became audible when lights of various colors were exhibited to the eye Smell taste touch sense of temperature etc were all found to fluctuate when lights were seen and sounds were heard Individuals varied much in the degree and kind of effect produced but almost every one experimented on seems to have been in some way affected The phenomena remind one somewhat of the dynamogenic effects of sensations upon the strength of muscular contraction observed by M Feré and later to be described The most fam [illegible] of them seem to be the inc [illegible]

Probably every one will agree that the best way of formulating all such facts is physiological it must be that the cerebral process of the first sensa

[1] Ladd *Physiol Psych* p 348 [2] *Mind* x p 567

[3] *Zwangsmassige Lichtempfindungen durch Schall* (Leipzig 1881)

[4] *Pflüger's Arch* v xlii p 154

comes in
it seems to
like these
cases and that the physiological formulation is everywhere the simplest and the best When s multaneous red and green l ht make us see yellow when three notes of the scale make us hear a chord it is not because the sensations of red and of green and of each of the three notes enter the mind as such and there combine or are combined by its relatin activity into the yellow and the chord it is because the larger sum of light waves and of air waves arouses new cortical processes to which the yellow and the chord directly correspond Even when the sensible qualities of things enter into the objects of our high est thinking it is surely the same Their several *sensations* do not continue to exist there tucked away They are *replaced* by the hi her thought which al though a different psychic unit from them knows the same sensible qualities which they know

The principles laid down in Chapter vi seem then to be corroborated in this new connection *You cannot build up one thought or one sensation out of many and only direct experiment can inform us of what we shall perceive when we get many sti ul at once*

The Eccentric Projection of Sensations

We often hear the opinion expressed that all our sensations at first appear to us as subjective or internal and are afterwards and by a special act on our part extradited or projected so as to appear located in an outer world Thus we read in Professor Ladd s valuable work that

Sensati ns a e p ychical states *wh e place*—so far as they can be s d to have
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an ct wn ch in its pe fect on esults fr m a long a d i tricate p ocess of develop ment. Tw n tewo thy stages or epoch maki g achieveme ts i the p oce s of elaborati the p entatio s f sense equ e a pecial c nsid ati These re *l cal t on* r the transf rmr f h

g g t these s nsation an object existen e (n the fullest sense of the wo d objecti e) as qualit es of bj cts tuated with n a field of pac and in c tact th o mo e o l ss em tely di tant f m the body

It seems to me that there is not a vestige of evidence for this view It hangs together w th the opinion that our sensations are or ginally devoid of all spatial content an opinion which I confess that I am wholly at a loss to understand

t in Bain *The*

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au ext ns on pa

As I look at my bookshelf opposite I cannot frame to myself an idea however imaginary of any feeling which I could ever possibly have got from it except the feeling of the same big extended sort of outward fact which I now perceive So far is it from being true that our first way of feeling things is the feeling of them as subjective or mental that the exact opposite seems rather to be the truth Our earliest most instinctive least developed kind of consciousness is the objective kind and only as reflection becomes developed do we become aware of an inner world at all Then indeed we ... more and more even to the point of ... uter world

e

... u out in some bodily part

a sensation which should not awaken an impulse to mov ... produce an outward effect ...

... the mutual contact of their own ... is followed by no such contraction These low animals can therefore already feel an outer world—even in the absence of innate ideas of causality and probably without ... truth the conviction that some ... thou ht It comes from sensa ... our own existence *If we* ... new born animals we never find th ... are first of all conscious of th ...

... of starting from an original pure ... sensation and seeking how this could possibly ... tive signification we mu ...

... nal immediate objectivity be ... ed into a remote one[1]

Another confusion much more common than the denial of all objective character to sensations is the assumption that they are all originally located *inside the body* and are projected outward by a secondary act This secondary judgment is always false according to M Taine so far as the place of the sensation itself goes But it happens to *hit* a real object which is at the point towards which the sensation is projected so we may call its result according to this author a *veridical hallucination*[2] The word Sensation to begin with

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as ... mere sensations or affec ... f oursel es nor possessed of the quali ...

(... op c t p 391)

A Riehl *Der Philosoph sch r K t cismus* vol II, pt II p 64

[2] *I t llige ce* part II bk II ch p II §§ ... Compar such t m ... c n quence is that wh n ...

thing w
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sation
by it a mental fact still leave to it a phys
erv neural tracts wh ch occasion its appearance when they are
k that it must *place itself*

All this seems highly confused and un
in an earlier chapter (p 139) cannot properly be said to *inhabit* any place it
d cognitive relations with everything

ing But the supposition that a sensation p
object to be n the same place w th the bra n is absolutely groundless and ne ther *a p or* p obabil ty nor facts from exper ence can be adduced to show that such a deliverance forms any part of the original cognitive function of our sens b lity

seat d cha
B t till
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Th s, all ur sensati ns ar gly sit t d d th red l is m e ex
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all t t d in th se sory ent f th ne ph l all ppear sit t d ls wh re and
la ll is t ch f th m ts ppar t t (V l II, pp 47 53)—S mi
lar h th se se f sight Th imm diat d t m

t arest and best passag I know is in Li bmann *Der Obj A blick* (869) pp 67

Where then do we feel the objects of our original sensations to be?

Certainly a child newly born in Boston who gets a sensation from the candle-flame which lights the bedroom or from his diaper pin does not feel either of these objects to be situated in longitude 72 W and latitude 41° N He does not feel them to be in the third story of the house He does not even feel them in any distinct manner to be to the right or the left of any of the other sensations which he may be getting from other objects in the room at the same time He does not in short know anything *about* their space-relations to anything else in the world The flame fills its own place the pain fills its own place but as yet these places are neither identified with nor discriminated from any other places That comes later For the places thus first sensibly known are elements of the child s space world which remain with him all his life and by memory and later experience he learns a vast number of things *about* those places which t f now But to the end of time cer m as the places *where those sen* o the question *where anything is* *there* and to name some sensation or other like those first ones which shall identify the spot Space *means* but the aggregate of all our possible sensations There is no duplicate space known *aliunde* or created making achievement into dropped They it thence

By his body then the child later means simply *that place where* the pain from the pin and a lot of other sensations like it were or are felt It true to say that he locates th

cans nothing more than *that place* the candle-flame and a lot of other sensations like it are felt He no more locates the candle in the outer world than he locates the outer world in the candle Once again he does both for the candle is part of what he *means* by outer world

This (it seems to me) will

cations comes from the fact that things *move* and that the original object which we feel them to be splits into two parts one of which remains as their whereabouts and the other s their quality or nature We th

hich it was originally but a sensa Gradually the system of these pos sensations takes more and more the place of the actual sensations Up and down become subjective notions east and west grow more correct than right and left etc and things get at last more truly located by their relation to certain ideal fixed co-ordinates than by their relation either to our bodies or to those objects by which their place was originally defined

Now this revision of our or
some facts which may very
whereby sensations get sho ed farther off than they originally

Few things indeed are more striking than the chan eable distance which the objects of many of our sensations may be made to assume A fly s humming may be taken for a distant steam whistle or the fly itself seen out of focus may for a moment give us the illusion of a d stant bird The same things seem much nearer or much farther accordin look at them through one end or another of an opera glass Our wh taken up with assigning their proper sensations An infant will grasp at the sensation to a distance which he know quoted case of the youn gentleman who was born blind and who was couched for the cataract by Mr Chesselden it is reported of the patient that when he first saw he was so far from mal any judgment about distances that he thought all objects whatever touc what he felt did his skin And other p surgical operation have been described as
at first saw and only gradually stretch

contact with our eyes

But tactile objects also may be affected with a like ambiguity of situation If one of the hairs of our head be pulled we are pretty accurately sensible of the direct on of the pulling by the movements imparted to the head But the feeling of the pull is localized not in that part of the hair s length which the fingers hold but in the scalp itself This seems connected with the fact that ou hair ha dly serves at all as a tact le organ In creatures with *vibrissæ* however and in those quadrupeds whose whiskers are tactile organs it can hardly be doubted that the feel ng is projected out of the root into the shaft of the hair itself We oursel es have an approach to this when the beard as a wh le r the hair as a whole is touched We perceive the contact at some dis tance from the skin.

When fixed and hard appendages of the body like the teeth and nails are touched we feel the contact where it objectively is and not deeper in where the erve-terminations lie If howe er the tooth is loose we feel two contacts spatially separated one at its root one at its top

F om this case to that of a hard body not o gan cally connected with the in contact with it the trans tion is immed ate

desc bed by the tip of our finger Similarly the drau htsman s immediate per cept on seems to be of the po nt of his pencil the surgeon s of the end of his kn fe the duellist s of the tip of his rapier as it plunges through his enemy s skin When on the middle of a vibrating ladder we feel not only our feet on

This is p ed by W be de ce f ca sin th head t b firmly p essed gainst p- port by another pe so wher po th directi f tractn ceases t b pe cei ed

the round but the ladder s feet against the ground far below If we shake a locked iron gate we feel the middle on which our hands rest move but we equally feel the stability of the ends where the hinges and the lock are and we seem to feel all three at once[1] And yet the place where the contact is *received* is in all these cases the skin whose sensations accordingly are sometimes interpreted as objects on the surface and at other times as objects a long distance off

We shall learn in the chapter on Space that our feelings of our own movement are principally due to the sensibility of our rotating *joints* Sometimes by fixing the attention say on our elbow joint we can feel the movement in the joint itself but we always are simultaneously conscious of the path which during the movement our finger tips describe through the air and yet the e same finger tips themselves are in no way physically modified by the motion A blow on our ulnar nerve behind the elbow is felt both there and in the fingers Refrigeration of the elbow produces pain in the fingers Electric currents passed through nerve trunks whether of cutaneous or of more pecial sen sibility (such as the optic nerve) give rise to sen at on localized beyond the n

ey do not have this feeling con ay be occasionally brought back This sometimes is the result of exciting electrically the nerve trunks buried in the stump

I recently faradized [says Dr Mitchell] a case of disartic [illegible] without warning my patient of the n [illegible] eased to [illegible] ly cried [illegible] empted to seize the missing member The [illegible] m I had conjured up swiftly disappeared but no pirit could have more amazed the man so real did it seem[2]

Now the apparent position of the lost extremity varies Often the foot seems on the ground or follows the position of the artificial foot where one is used Sometimes where the arm is lost the elbow will seem bent and the hand in a fixed position on the breast Sometimes again the position is non natural and the hand will seem to bud straight out of the shoulder or the foot to be on the same level with the knee of the remaining leg Sometimes again the position is vague and sometimes it is ambiguous as in another patient of Dr Weir Mitchell s who

lost his leg at the age of eleven and remembers that the foot by degrees approached and at last reached the knee When he began to wear an artificial le it rea sumed in time its old position and he is never at present aware of the leg as shortened unless for some time he talks and thinks of the stump and of the missing leg when the direction of attention to the part causes a feeling of discomfort and the subjective sensation of active and unpleasant movement of the toes With these feelings returns at once the delusion of the foot as being placed at the knee

All these facts and others like them can easily be described as if our sensations might be induced by circumstances to migrate from their *original locality* near the brain or near the surface of the body and to appear farther

[1] Lotze *Med Psych* pp 4 8–33 Lipps *G dt tsach n d s Se l l b* s p 582

[2] *I juries to Nerves* (Philadelphia 18 2) p 350 ff

off and (under different circumstances) to return again after having mi grated But a little analysis of what happens shows us that this description is inaccurate

The objectivity with which each of our sensations originally comes to us the roomy and spatial character which is a primitive part of its content is not in the first instance relative to any other sensation The first time we open our eyes we ... but which is not yet *placed* in relation

It is a place ...

that this same place is in *front* of us that only means ...

something *about* it namely that it is *congruent with that other* place called ... ns of the arm and hand or of the

...

not be immediately located ...

places which their feelings ...

inform us and in the next chapter we shall ...

experience does this by means of discrimination association selection and other constantly working functions of the mind When therefore the baby grasps at the moon that does not mean that what he sees fails to give him the sensation which he afterwards knows as distance *it means only* that he has not learned at what *tactile or ma*...

visual distance are And when a p...

to his face for far-off objects that only means ...

optical s...ns of differing distances are absent from the poor creature s sensation anyhow His vision is monocular (only one eye being operated at a time) the lens is gone and everything is out of focus he feels photophobia lachrymation and other painful resident sensations of the eyeball itself whose place he has long since learned to know in tactile terms what wonder then that the first tactile reaction which the new sensations provoke should be one associated with the tactile situation of the organ itself? And as for his assertions about the matter what wonder again if as Prof Paul Janet says they are still expressed in the tactile language which is the only one he knows "*To be touched* means for him to receive an impression without first making a movement His eye gets such an impression now so he can only say that the objects are touching it.

> All his language borrowed from touch, but applied to the objects of his sight, make us think that he perceives differently from ourselves whereas at bottom it is only his different way of talking about the same experience.

The other cases of translocation of our sensations are equally easily interpreted without supposing any projection from a centre at which they are

In reality it probably means only restless movement of desire which he might make even after he had become aware of his impotence to touch the object.

Revue philosophique ii, p. ... an admirable critical ... in the course of which M Janet gives a bibliography of the cases in question. See also Dunan *ibid* xxv 65–67 They are also discussed and similarly interpreted by T K. Abbott *Sight and Touch* (1864) chap x.

originally perceived. Unfortunately the details are intricate, and what I say now can only be made fully clear when we come to the next chapter. We shall then see that we are constantly selecting certain of our sensations as *realities* and degrading others to the status of *signs* of these. When we get one of the signs we think of the reality signified; and the strange thing is that then the reality (which need not be itself a sensation at all at the time, but only an idea) is so interesting that it acquires an hallucinatory strength which may even eclipse that of the relatively uninteresting sign and entirely divert our attention from the latter. Thus the sensations to which our joints give rise when they rotate are signs of what, through a large number of other sensations, tactile and optical, we have come to know as the movement of the whole limb. This movement of the whole limb is what we *think of* when the joint's nerves are excited in that way; and *its* place is so much more important than the joint's place that our sense of the latter is taken up, so to speak, into our perception of the former, and the sensation of the movement seems to diffuse itself into our very fingers and toes. But by abstracting our attention from the suggestion of the entire extremity we can perfectly well perceive the same sensation as if it were concentrated in one spot. We can identify it with a differently located tactile and visual image of 'the joint' itself.

Just so when we feel the tip of our cane against the ground. The peculiar sort of movement of the hand (impossible in one direction, but free in every other) which we experience when the tip touches 'the ground,' is a sign to us of the visual and tactile object which we already know under that name. We think of 'the ground' as being there and giving us the sensation of this kind of movement. The sensation, we say, comes *from* the ground. The ground's place seems to be its place; although at the same time, and for very similar practical reasons, we think of another optical and tactile object, 'the hand,' namely, and consider that *its* place *also* must be the place of our sensation. In other words, we take an object or sensible content A, and confounding it with another object otherwise known, B, or with two objects otherwise known, B and C, we identify its place with their places. But in all this there is no 'projecting' (such as the extradition philosophers talk of) of A out of an *original* place; no primitive location which it first occupied '*away from*' these other sensations has to be contradicted; no natural 'centre' from which it is expelled exists. That would imply that A aboriginally came to us in definite local relations with other sensations, for to be *out* of B and C is to be in local relation with them as much as to be *in* them is so. But it was no more out of B and C than it was in them when it first came to us. It simply had nothing to do with them. To say that we feel a sensation's seat to be 'in the brain' or 'against the eye' or 'under the skin' is to say as much *about* it and to deal with it in as non-primitive a way as to say that it is a mile off. These are all secondary perceptions, ways of defining the sensation's seat *per aliud*. They involve numberless associations, identifications, and imaginations, and admit a great deal of vacillation and uncertainty in the result.[1]

[1] The intermediary and shortened localization of the lost hand and foot in the amputation cases also show this. It is easy to see why the phantom foot might continue to follow the position of the artificial one. But I confess that I cannot explain its half-way position.

I conclude then that there is no truth in the "eccentric projection" theory. It is due to the confused assumption that the bodily processes which cause a sensation must also be its seat. But sensations have no seat in this sense. They *become* seats for each other as fast as experience associates them together; but that violates no primitive seat possessed by any one of them. And though our sensations cannot then so analyze and talk of themselves, yet at their very first appearance quite as much as at any later date are they cognizant of all those qualities which we end by extracting and conceiving under the names of *objectivity, exteriority* and *extent*. It is surely subjectivity and interiority which are the notions *latest* acquired by the human mind.

It is from this confused assumption [illegible] an upside-down picture [illegible] the retina, [illegible] supposed to inhabit the picture [illegible] jects of space. But the truth is tha[illegible] [illegible] else, for immediate consc[illegible] [illegible]. The outer object is given imm[illegible] and determined in relation to other sensations. [illegible] see what by touch we afterwards know as our feet the "top" is the place in which we see what we know as the people's heads, etc., etc. Berkeley long ago made this matter perfectly clear (see his Essay towards a New Theory of Vision, §§ 93–98, pp. [illegible] 3 [illegible] 8).

For full justification the reader must see the next chapter. He may object, against the summary account given now, that in the babe's immediate field of vision the various things which appear are located *relatively to each other* from the outset. I admit that, *if discriminated*, they would appear so located. But they are parts of the content of one sensation, not sensations separately experienced, such as the text is concerned with. The fully developed [illegible] in which all our sensations ultimately find location, is nothing but an imaginary [illegible] framed after the pattern of the field of vision, by the addition and continuation of one sensation upon another *in an orderly and systematic way*. In corroboration of my text I must refer to pp. 5[illegible]–60 of Riehl's book quoted above on page 4[illegible] and to Uphues, *Wahrnehmung und Empfindung* (1888), especially the *Einleitung* and pp. 5[illegible]–6[illegible].

Chapter XVIII

IMAGINATION

Sensations once experienced modify the ner ous organ m *t* *them arise again in the* *d*

u nay dream of sights the deaf of sounds for years after they have lost their vision or hearing [1] but the man *born* deaf can never be made to imag ine what sound is like nor can the man *born* blind ever have a mental vision In Locke s words already quoted the mind can frame unto itself no one new simple idea The originals of them all must have been given from without Fantasy or Imagination are the names given to the faculty of reproducing copies of originals once felt The imagination is called reproductive when the copies are literal productive when elements from different o t combined so as to make ne v h t

im o uuld seem to be those tardier images (due to what the Germans call *Sinnesgedachtniss*) which were spoken of (p 424)—coercive hauntings of the mind by echoes of unusual experiences for hours after the latter have taken place The phenomena ordinarily ascribed to imagination however are th ossible sensible experiences ght give rise o c e enough to constitute a *date* L ures when they revive form *recollections* We have already studied the machinery of recollection in Chapter xvi When the mental pictures are of data freely combined and reproducing no past combination exactly we have acts of imagination properly so called

Our Images Are Usually Vague

For the ordinary anal t n

o b u ucas We have n t t

son to reject this view (see p t is at any one moment thought n s gether If I slip into the ordin y ay of talking and speak of various ideas combining the reader will understand that this is only for popularity and

[1] Prof Jastrow has ascertained by statistical inqu ry among the blind that if th r blind ness have occurred bef re a period embr ced between the f fth and se nth years the u l centres seem to decay and visu l dreams and images re g dually o tg own. If si ht is lost after the sev nth year isual imaginati n seems t s rvi e thr h life See Pr f Jastrow s interesting article on The Dreams of the Blind in the New P t R i ew for January 1888

convenience and he will not construe it into a concession to the atomistic theory in chology N t only were ideas copies of

or

co

posses —

completely adequate copies not by appeal to obs

soning as follows

> The mind can ot form any not o otion f the degre s of each (fo) senses o in othe words that no in o t b ng d termin d in ts d gre which impr s o s re s m time unsteadi ess not f m any cap c ts eal ex tence has no particula t rm a d e implies th fl ttest f all co tr dicti s the sam thing both t be and n t to be Now s c all ideas a e deri ed f om imp es t t ns f them wh te r i true of the
>
> An dea s weake impres on a d as a tro g imp essi d t rmi te quantity and quality the ase m st be the same with ts copy or repre sent t e

The slightest ntrospective glance will show to anyone the falsity of this op n ion Hume surely had mages of his own works without seeing distinctly every word and letter upon the pa es which floated before his mind s eye His dictum is the efore an exquisite example of the way in which a man will be blinded by *prior* theo ies to the most flagrant facts It is a rather remarkable thing too that the p ycholo ists of Hume s own empiricist school have as a rule been more guilty of this bli dness than their opponents The fundamental *facts* of consc usness have been n the whole more accurately reported by the spirit ualist c write s None of Hume s pupils so far as I know until Taine and Hux l y eve took the pa ns to contradict the op n on of their master Prof Huxley n hi br llia t l ttle work on Hume set the matter straight in the following w ds

> Wh c mplex imp essi ns or omplex deas are p oduced as memories t s p b-

som thin that h has fo gotten. Almost ll f not all o r memories a e the f e ket h th than port aits of the rigin ls—th sal ent features are ob o s h le th ubo dinat ch acters e obscur o unrepresented

N w hen se ral mplex mp ess ons whi h m les different f m e anoth —l t us say that t f ten imp es ons in each six are the sam n all nd f ur ar different from all the rest—are essi ely p esented t the mind t easy t see hat must be the nature of th esult. The epetition of the six imila impres

Impressio means sensatio f Hume. T tise f H ma Nat part I, § ii.

sions will strengthen the six corresponding elements of the complex idea which will therefore acquire greater vividness while the four differing impressions of each will not only acquire no greater strength than they had at first but in accordance with the law of association they will all tend to appear at once and will thus neutralize one another

This mental operation may be rendered comprehensible by considering what takes place in the formation of compound photographs—when the images of the faces of six sitters for example are each received on the same photographic plate for a sixth of the time requisite to take one portrait The final result is that all those points in which the six faces agree are brought out strongly while all those in which they differ are left vague and thus what may be termed a *generic* portrait of the six in contra distinction to a *specific* portrait of any one is produced

Thus our ideas of single complex impressions are incomplete in one way and tho e of numerous more or less similar complex impressions are incomplete in another way that is to say they are *generic* not *specific* And hence it follows that our ideas of the impressions in question are not in the strict sense of the word copies of tho e impressions while at the same time they may exist in the mind independently of language

The generic ideas which are formed from several similar but not identical complex experiences are what are called *abstract* or *general* ideas and Berkeley endeavored

as one of the greatest and the most valuable discoveries that has been made of late years in the republic of letters and endeavors to confirm it in such a manner that it shall be put beyond all doubt and controversy

I may venture to express a doubt whether he has succeeded in his object but the subject is an abstruse one and I must content myself with the remark that though Berkeley s view appears to be largely applicable to such general ideas as are formed after language has been acquired and to all the more abstract sort of conceptions yet that general ideas of sensible objects may nevertheless be produced in the way indicated and may exist independently of language In dreams one sees houses trees and other objects which are perfectly recognizable as such but which remind one of the actual objects as seen out of the corner of the eye or of the pictures thrown by a badly focussed magic lantern A man addresses us who is like a figure seen in twilight or we travel through countries where every feature of the scenery is vague the outlines of the hills are ill marked and the rivers have no defined banks. They are in short generic ideas of many past impressions of men hills and rivers. An anatomist who occupies himself intently with the examination of several peci mens of some new kind of animal in course of time acquires so vivid a conception of its form and structure that the idea may take visible shape and become a sort of waking dream But the figure which thus presents itself is generic not specific It is no copy of any one specimen but more or less a mean of the series and there seems no reason to doubt that the minds of children before they learn to peak and of deaf mutes are peopled with similarly generated generic ideas of sensible objects [1]

Are Vague Images Abstract Ideas'?

The only point which I am tempted to criticise in this account is Prof Hux ley s *identification of these generic images with abstract or general ideas' in the sense of universal conceptions* Taine gives the truer view He writes

[1] Huxley Hu e pp. 92–94

araucanas
r nod bark
igh bristlin

form cut in upon the fine sotuy
what this experience h s left in
araucana in fact I have b en a
the plant But th re is a difference between this rep esentation and the
ti ns of which t is the present echo The int rnal emblance from hich I ha e just made my description is ague and my past e sations were precise. Fo assuredly each of the a aucanas I s v th n excited in me a di tinct visual sensat on there are n two absolutely simila pl nts in n tu e I ob erved pe haps twenty or thirty araucanas without a doubt *each one of them differed f om the others in size in g rth* by the mo e or less obtuse hy th mo e or less abrupt jutting out of ts scales by the sty
sensati ns were different
its echo the twenty o thirty e
agglutinated by their esemblance they ar confounded together and my p esent r presentat on is their res due only This is the product or rather the fr ement which is (enes of similar facts or indiv duals (

col less gu representation into which
sat ons in an utterly feeble incomplete a d abo ti e tate —*But this epre entat on is not th ge al and ab tract idea It h t ts cco npani ne t* and f I may say so the re f om which it is extr cted
a k tch th sens ble sk tch of a d
po ds to the wh le class t diff rs
Mo eo er my abstract dea s perf
I er fail to rec gnize an araucaria among the ari us plan
me t differs then from the confused and floatin representation I have of some particular araucaria.

In other words a blurred picture is just as much a single mental fact as a sharp p cture is and *the use of either picture by the mind to symbol e a whole class of d viduals s a new mental function* requir ng some other modification of c nsciousness than the mere perception that the p cture is distinct or not. I m h m h d t nct ess of my mental image of my absent friend That d

sharp or dim This was explained in a p evious place (see p 308 ff e pec ally the ote to page 311) and I would not touch upon the matter at all here but for ts histor cal interest

Our deas or images of past sensible experiences may then be either distinct

idea of a triangle wh ch must be ne ther oblique nor rectangle neither equi

Int Logic (N Y) L ii, p 39

lateral equicrural nor scalenon but all and none of these at once' Berkeley says

> If any — h an idea of a triangle as is here desc[illegible] of it nor would I go about it All I de[illegible] reader would fully and certainly inform himself whether *he* has such an idea or no[1]

Until very recent years it was supposed by all philosophers that there was a typical human mind which all individuals minds were like and that propositions of universal validity could be laid down about such faculties as the Imagination Lately however a mass of revelations have poured in which make us see how false a view this is There are imaginations not the Imagination and they must be studied in detail

Individuals Differ in Imagination

The first breaker of ground in this direction was Fechne[illegible] Fechner was gifted with unusual talent [illegible] [illegible] s own [illegible] mory pictures together with accounts b[illegible] eral other individuals of their optical memory pictures[2] The result was

[1] *Principles of Human Knowledge* Introd § 13 Compare also the passage quoted above p 305

[2] The differences noted by Fechner between after images and images of imagination proper are as follows

After images	*Imagination images*
Feel coercive	Feel subj ct to our pontaneity
Seem unsubstantial vaporous	Have as it were more body
Are sharp in outline	Are blurred
Are bright	Are darker than even the darkest black of the aft r images
Are almost colorless	Have h ely c loration
Are continuously enduring	Incessantly disappear and have to be re newed by an effort of will—at last even this fails to revive them
Cannot be voluntarily changed	Can be exchang d at will for others
Are exact copies of originals	Cannot violate the nec ssary laws of appearance of their originals—e g a man cannot be imagined from in front and beh nd t once—the imagination must walk round him so to peak
Are more easily got with shut than with open eyes	Are more eas ly had with open tha with hut
Seem to move when the head r eyes move	Need not follow movements of head o yes
The fi ld within wh ch they appear (with closed eyes) is dark contracted flat close to the eyes n f ont and the images ha e no perspective	The f ld is exten ive in th ee d mensi ns and I ject an be imagined n it above or behind almost as easily as in front
The attenti n seems dir cted forwards to wards the sense-o g n in observing after images	*In imagin ng the attenti n feels as if dr n backwards towards the b in*

Fin lly Fechner speaks f th impos b l ty of atte din t both aft r im g s d magi nati n images at o c even when they are of th sam bj t and might be p t d to combine All these differ nces are true of F chn but many of th m w uld be unt u f other persons I quote them as a type f bservati n which any re der with suffici nt pa

I would be interesting he writes to to sho work I kept me

Fechner s intention was independently executed by ... tion of whose results in 1880 may be said to have made an era in descriptive Psychology

It s ... the reader with my early tentati e steps A tain more d stood best in these re pects without forgetting the most im po ... tempt my c rresp d t to writ f eely in fuller explanation of their r plies and n cognate top cs s well Thes sep rate l tters ha e pro ed more nstru ti e and inter esting by f r than the epl es to the set questions

Th first group of the ather lon series of queries el ted to the illumination defi I ... d we framed thus

morning—and co ...

1 *Ill m natio* —Is the image dim or fairly clea ? Is ts brightness comparable to th t of the tual scene?

Definitio —Are ll the objects p etty well defined at the sam time or is the pla e of sharpest definit n at any one moment mo contra ted than t is in a real scene?

3 *Colori g*—Are the c lo s of the china of the t a t b ead cru t mustard meat parsley o wh teve m y ha been o th table, quite distinct and natu al?

Th l t es lts f my inquiry ama ed me I had begun by q esti ning frie ds

... hich uppli s th m t rial o t of which dreams and the well kn wn hallucinatio s of sick people built

T my astoni hment I f und that *th great m j rity of the me of sci n e to al om*

nat e f l They had mental deficiency of which th y w unaware and nat ally enough uppo d that th se who affirm d they p ssed t w e mancing T ill trate their mental tit d t will b ufficient t quote a f w lines f m the l tt f f my rre pondents who writes

These quest ns p ppose assent to s m sort of a p op ti n r garding the m d ye, and th im es which it sees Thi p ints to some initial fallacy It nly by a figure of speech that I can describe my ecollection of a scene as mental image which I can see w th my mind ye I d n t e t any m than a man es the th usand lines of Sophocles which under due p es ure he is eady t epeat. Th memory possesses it etc.

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tien may epeat. T th m may be dded as uni sal propositi that fter images seem larger if p ject th m distant scree and malle if w p ject th m ne whilst no ch chang takes place in me tal pictures.

Much the same result followed inquiries made for me by a friend among members of the French Institute

On the other hand, when I spoke to persons whom I met *in general society*, I found an entirely different di position to prevail *Many men and a yet larger number of women and many boys and girls declared that they habitually saw mental imagery and that it was perfectly distinct to them and full of color* The more I pressed and crossed questioned them professing myself to be incredulous the more obvious was the truth of the [illegible] imagery in minute detail and they spoke in a [illegible]
I felt that I my [illegible]
scene that lay before my eyes in broad daylight to a blind man who [illegible]
doubting the reality of vision Reass[illegible] [illegible] experience I recommenced to inquire among scientific men and [illegible]
though in by no means the same abu[illegible]
tions more generally among my friends and through [illegible]
from persons of both sexes and of various ages and in the end from occasional correspondents in nearly every civilized country

I have also received batches of answers from various educational establishments both in England and America which were made after the masters had fully explained the meaning of the questions and interested the boys in them These have the merit of returns derived from a general census which my other data lack because I cannot for a moment suppose that the writers of the latter are a haphazard proportion of those to whom they were sent Indeed I know of some who disavowing all possession of [illegible] in too faint a degree to enable them [illegible]

[illegible]

correspondents and I may a[illegible]
tion I have els[illegible] [illegible]mity of replies from so many [illegible]
sources which [illegible]
on the whole [illegible]
amusing instances of break down) and the evident effort made to [illegible]
answers have convinced me that it is a much easier matter than I had anticipated to obtain trustworthy replies to psychological questions Many persons especially women and intelligent children take pleasure in introspection and strive their very best to explain their mental processes. I think that a delight in self dissection must be a strong ingredient in the pleasure that many are said to take in confessing themselves to priests

Here then are two rather notable results the one is the proved facility of obtaining statistical insight into the processes of other persons minds whatever *a priori* objection may have been made as to its possibility and the other is that scientific men as a class have feeble powers of visual representation There is no doubt whatever on the latter point however it may be accounted for My own conclusion is that an over ready perception of sharp mental pictures is antagonistic to the acquirement of habits of highly generalized and abstract thought especially when the steps of rea[illegible] [illegible] symbols and that if the faculty of seeing the pic[illegible]

[illegible]

[illegible]mbine All these differences are tru[illegible] so sen[illegible] [illegible]
[illegible]her persons I quote them as a type of[illegible]cipient motor sense not of the eyeballs only but of the [illegible]
[illegible]o declare themselves entirely deficient in the pow[illegible] of
[illegible]ertheless gi[illegible]e lifelike de[illegible]criptions of what they have

seen, and can otherwise express themselves as if they were gifted with a vivid visual imagination. *They can also become painters of the rank of Royal Academicians.*

It is a mistake to suppose that sharp sight is accompanied by clear visual memory. I have not a few instances in which the independence of the two faculties is emphatically commented on; and I have at least one clear case where great interest in outlines and accurate appreciation of straightness, squareness, and the like, is unaccompanied by the power of visualising. Neither does the faculty go with dreaming. I have cases where it is powerful, and at the same time where dreams are rare and faint or altogether absent. One friend tells me that his dreams have not the hundredth part of the vigour of his waking fancies.

The visualising and the identifying powers are by no means necessarily combined. A distinguished writer on metaphysical topics assures me that he is exceptionally quick at recognising a face that he has seen before, but that he cannot call up a mental picture of any face with clearness.

Some persons have the power of combining in a single perception more than can be seen at any one moment by the two eyes.

I find that a few persons can, by what they often describe as a kind of touch-sight, visualise at the same moment all round the image of a solid body. Many can do so nearly, but not altogether round that of a terrestrial globe. An eminent mineralogist assures me that he is able to imagine simultaneously *all the sides of a crystal with* which he is familiar. I may be allowed to quote a curious faculty of my own in respect to this. It is exercised only occasionally and in dreams, or rather in nightmares, but under those circumstances I am perfectly conscious of embracing an entire sphere in a single perception. It appears to lie within my mental eyeball, and to be viewed centripetally.

This power of comprehension is practically attained in many cases by indirect methods. It is a common feat to take in the whole surroundings of an imagined room with such a rapid mental sweep as to leave some doubt whether it has not been viewed simultaneously. Some persons have the habit of viewing objects as though they were partly transparent; thus, if they so dispose a globe in their imagination as to see both its north and south poles at the same time, they will not be able to see its equatorial parts. They can also perceive all the rooms of an imaginary house by a single mental glance, the walls and floors being as if made of glass. A fourth class of persons have the habit of recalling scenes, not from the point of view whence they were observed, but from a distance, and they visualise their own selves as actors on the mental stage. By one or other of these ways, the power of seeing the whole of an object, and not merely one aspect of it, is possessed by many persons.

The place where the image appears to lie differs much. Most persons see it in an indefinable sort of way, others see it in front of the eye, others at a distance corresponding to reality. There exists a power which is rare naturally, but can, I believe, be acquired without much difficulty, of projecting a mental picture upon a piece of paper, and of holding it fast there, so that it can be outlined with a pencil. To this I shall recur.

Images usually do not become stronger by dwelling on them; the first idea is commonly the most vigorous, but this is not always the case. Sometimes the mental view of a locality is inseparably connected with the sense of its position as regards the points of the compass, real or imaginary. I have received full and curious descriptions from very different sources of this strong geographical tendency, and in one or two

I am myself a good draughtsman, and have a very lively interest in pictures, statues, architecture and decoration, and a keen sensibility to artistic effects. But I am an extremely poor visualiser, and find myself often unable to reproduce in my mind even pictures which I have most carefully examined.—V. J.

Much the same result followed inquiries made for me by a friend among members of the French Institute

On the other hand, when I spoke to persons whom I met *in general society* I found an entirely different disposition to prevail *Many men and a yet larger number of women and many boys and girls declared that they habitually saw mental imagery and that it was perfectly distinct to them and full of color* The more I pressed and crossed questioned them professing myself to be incredulous the more obvious was the truth of their first assertions They described their imagery in minute detail and they spoke in a tone of surprise at my apparent hesitation in accepting what they said I felt that I myself should have spoken exactly as they did if I had been describing a scene that lay before my eyes in broad daylight to a blind man who persisted in doubting the reality of vision Reassured by this happier experience I recommenced to inquire among scientific men and soon found scattered instances of what I sought though in by no means the same abundance as elsewhere I then circulated my questions more generally among my friends and through their hand and obtained replies from persons of both sexes and of various ages and in the end from occasional correspondents in nearly every civilized country

I have also received batches of answers from various educational establishments both in England and America which were made after the masters had fully explained the meaning of the questions and interested the boys in them These have the merit of returns derived from a general census which my other data lack because I cannot for a moment suppose that the writers of the latter are a haphazard proportion of those to whom they were sent Indeed I know of some who disavowing all possession of the power and of many others who possessing it in too faint a degree to enable them to express what their experiences really were in a manner satisfactory to themselves sent no returns at all Considerable statistical similarity was however observed between the sets of returns furnished by the schoolboys and those sent by my separate correspondents and I may add that they accord in this respect with the oral information I have elsewhere obtained The conformity of replies from so many different sources which was clear from the first the fact of their apparent trustworthiness being on the whole much increased by cross examination (though I could give one or two amusing instances of break down) and the evident effort made to give accurate answers have convinced me that it is a much easier matter than I had anticipated to obtain trustworthy replies to psychological questions Many persons especially women and intelligent children take pleasure in introspection and strive their very best to explain their mental processes I think that a delight in self dissection must be a strong ingredient in the pleasure that many are said to take in confessing themselves to priests

Here then are two rather notable results the one is the proved facility of obtaining statistical insight into the processes of other persons minds whatever *a priori* objection may have been made as to its possibility and the other is that scientific men as a class have feeble powers of visual representation There is no doubt whatever on the latter point however it may be accounted for My own conclusion is that an over ready perception of sharp mental pictures is antagonistic to the acquirement of habits of highly generalized and abstract thought especially when the [illegible] of rea[illegible] on by words as symbols and that if the faculty of s[illegible] [illegible]ures was ever po[illegible] by men who think hard it is very apt to be lo[illegible] [illegible] use The highest minds are pro[illegible]ably those in which it is not lost but subord[illegible] and is ready for use on suitable o[illegible] [illegible] I am howe[illegible] bound to say th[illegible] faculty seems to be replaced [illegible] so[illegible] ers[illegible] ceably by oth[illegible] m[illegible] s of concep[illegible] [illegible] believe connected with the in[illegible]cipient motor sense not of the eyeballs only [illegible] muscles generally that *men wh*[illegible] *d[illegible] clare th[illegible] m[illegible] [illegible] ly deficient in th[illegible] pow*[illegible] *seeing mental pictures can ne*[illegible] [illegible] of what they [illegible]

color than any other one thing; if, for example, I were to recall a plate decorated with flowers I could reproduce in drawing the exac... wh... en the table is perfectly vivid.—There is ... images. I can see all four sides of room, I can ... even more rooms with such distinctness that if you should ask me what was in any particular place in any one, or ask me to count the chairs, etc., I could do it without the least hesitation. ... more clearly do I see images of ... pages. Even before ... ly word for wo... I have no idea f wh... doing this I used to think it was merely because I knew the lines ... have quite convinced myself that I really do see an image. The strongest proof that such is really the fact is I think the following:

I can look down the mentally seen page and see the words that *commence* all the lines and from any one of these words I can continue the line. I find this much easier to do if the words begin in a straight line than if there are breaks. Example:

Etant fait
Tous
A de
Que fit
Ceres
A ec
U ...eur
Comme

La F...ntaine, S, iv

The poor visualizer says:

My ability to form mental images seems, from what I have studied of other people's images, to be defective and somewhat peculiar. The process by which I seem to remember any particular event is not by a series of distinct images, but a sort of panorama, the faintest impressions of which are perceptible through a thick fog.—I cannot ... eyes and get a distinct image of anyone, although I used to be able to ...

I cannot say what I see. I could not possibly count the chairs, but I happen to know that there are ten. I see ... in detail.—The chief thing is a general impression that I cannot tell exactly what I do see. The coloring is about the same, as far as I can recall it, only very much washed ... Perhaps the only color I can see at all distinctly is that of the table-cloth, and I could probably see the color of the wall-paper if I could remember what color it was.

A person whose visual imagination is strong finds it hard to understand how those who are without the faculty can think at all. *Some people undoubtedly have no visual images at all worthy of the name*, and instead of seeing their

Take the following report from one of my students: I am unable to form in my mind's eye any visual likeness of the table whatever. After many trials, I can only get a hazy surface, with nothing on it or above it. I can see no variety in color, and no positive limitations in extent, ... I cannot see what I see well enough to determine its position in respect to my eye, or to endow it with any quality of size. I am in the same position as to the word dog. I cannot see it in my mind's eye at all; and so cannot tell whether I should have to run my eye along it, if I did see it.

cases I have reason to think it allied to a considerable faculty of geographical comprehension

The power of visualizing is higher in the female sex than in the male and is somewhat but not much higher in public school boys than in men. After maturity is reached the further advance of age does not seem to dim the faculty but rather the reverse judging from numerous statements to that effect but advancing years are sometimes accompanied by a growing habit of hard abstract thinking and in these cases—not uncommon among those whom I have questioned—the faculty undoubtedly becomes impaired There is reason to believe that it is very high in some young children who seem to spend years of difficulty in distinguishing between the subjective and objective world Language and book learning certainly tend to dull it

The visualizing faculty is a natural gift and like all natural gifts has a tendency to be inherited In this faculty the tendency to inheritance is exceptionally strong as I have abundant evidence to prove especially in respect to certain rather rare peculiarities which when they exist at all are usually found among two three or more brothers and sisters parents children uncles and aunts and cousins

Since families differ so much in respect to this gift we may suppose that races would also differ and there can be no doubt that such is the case I hardly like to refer to civilized nations because their natural faculties are too much modified by education to allow of their being appraised in an off hand fashion I may however speak of the French who appear to possess the visualizing faculty in a high degree The peculiar ability they show in prearranging ceremonials and *fetes* of all kinds and their undoubted genius for tactics and strategy show that they are able to foresee effects with unusual clearness Their ingenuity in all technical contrivances is an additional testimony in the same direction and so is their singular clearness of expression. *Their phrase figure vous or picture to yourself seems to express their dominant* mode of perception Our equivalent of imagine is ambiguous

I have many cases of persons mentally reading off scores when playing the pianoforte or manuscript when they are making speeches One statesman has assured me that a certain hesitation in utterance which he has at times is due to his being plagued by the image of his manuscript speech with its original erasures and corrections He cannot lay the ghost and he puzzles in trying to decipher it

Some few persons see mentally in print every word that is uttered they attend to the visual equivalent and not to the sound of the words and they read them off usually as from a long imaginary strip of paper such as is unwound from telegraphic instruments

The reader will find further details in Mr Galton s *Inquiries into Human Faculty* pp 83 114 I have myself for many years collected from each and all of my psychology students descriptions of their own visual imagination and found (together with some curious idiosyncrasies) corroboration of all the variations which Mr Galton reports As examples I subjoin extracts from two cases near the ends of the scale The writers are first cousins grandsons of a distinguished man of science The one who is a good visualizer says

This morning s breakfast table is both dim and bright it is dim if I try to think of it when my eyes are open upon any object it is perfectly clear and bright if I think of it with my eyes closed — All the objects are clear at once yet when I confine my attention to any one object it becomes far more distinct —I have more power to recall

[1] See also McC sh and Osborne in the *Prin t n R v w* J n 1884 Th re a som good examples of high dev l pm nt of th f culty in th *Lo d n Spe t t* De 8 1875 pp 1631 1634 Jan 4 11 25 and March 8 1879

she to imagine it, and I can tell you nothing about it. He has often drawn the port of A. To-day he vainly tries to trace its principal outlines. Asked to draw a minaret, he reflects, says it is a square tower, and draws, rudely, four lines, one for ground, one for top and two for sides. Asked to draw an arcade, he says, 'I remember that it contains semi-circular arches, and that two of them meeting at an angle make a vault, but how it *looks* I am absolutely unable to imagine.' The profile of a man which he drew by request was as if drawn by a little child, and yet he confessed that he had been helped to draw it by looking at the bystanders. Similarly he drew a shapeless scribble for a tree.

He can no more remember his wife's and children's faces than he can remember [illegible] he [illegible] with them some time they seem unusual to him. He [illegible]

[illegible] amnesia extends to dating objects from his childhood years—paternal [illegible] forgotten.

No other disturbances but this loss of visual images occur. Now when he seeks something in his correspondence, he must rummage among the letters like other men until he meets the passage. He can recall only the first few verses of *The Iliad*, and must grope to read Homer, Virgil, and Horace. Figures which he adds he must now whisper to himself. He realizes clearly that he must help his memory out with auditory images, which he does with effort. *The words and expressions which he recalls seem now to echo in his ear, an altogether novel sensation for him.* If he wishes to learn by heart anything, a series of phrases for example, he must *read them several times aloud*, so as to impress his ear. When later he repeats the thing in question, the sensation of inward hearing which precedes articulation rises up in his mind. This feeling was formerly unknown to him. He speaks French fluently, but affirms that he can no longer think in French, but must get his French words by translating them [illegible]

[illegible]

The auditory type [says M. A. Binet] *appears to be rarer than the visual.* Persons of this type imagine what they think of in the language of sound. In order to remember a lesson they impress upon their mind, not the look of the page, but the sound of the words. They reason, as well as remember, by ear. In performing a mental addition they repeat verbally the names of the figures, and add, as it were, the sounds, without any thought of the graphic signs. Imagination also takes the auditory form. 'When I write a scene,' said Legouvé to Scribe, 'I *hear*; but you *see*. In each phrase which I write, the voice of the personage who speaks strikes my ear. *Vous, qui êtes le théâtre même*, your actors walk, gesticulate before your eyes; I am a *listener*, you a [illegible]

[illegible] (1886), p. 5.

breakfast table they tell you that they *remember* it or *know* what was on it. This knowing and remembering takes place undoubtedly by means of verbal images as was explained already in Chapter IX p 172

The study of Aphasia (see p 35) *has of late years shown how unexpectedly great are the differences between individuals in respect of imagination* And at the same time the discrepancies between lesion and symptom in different cases of the disease have been largely cleared up In some individuals the habitual thought stuff if one may so call it is visual in others it is auditory articulatory or motor in most perhaps it is evenly mixed The same local cerebral injury must needs work different practical results in persons who differ in this way In one it will throw a much used brain tract out of gear in the other it may affect an unimportant region A particularly instructive case was published by Charcot in 1883[1] The patient was

Mr X a merchant born in Vienna highly educated master of German Spanish French Greek and Latin Up to the beginning of the malady which took him to Professor Charcot he read Homer at sight He could starting from any verse out of the first book of *The Iliad* repeat the following verses without hesitating by heart Virgil and Horace were familiar He also knew enough of modern Greek for business purposes Up to within a year (from the time Charcot saw him) he enjoyed an exceptional *visual* memory *He no sooner thought of persons or things but features forms* and colors arose with the same clearness sharpness and accuracy as if the objects stood before him When he tried to recall a fact or a figure in his voluminous polyglot *correspondence the letters themselves appeared before him with their entire content* irregularities erasures and all At school he recited from a mentally seen page which he read off line by line and letter by letter In making computations he ran his mental eye down imaginary columns of figures and performed in this way the most varied operations of arithmetic He could never think of a passage in a play without the entire scene stage actors and audience appearing to him *He had been a great traveller* Being a good draughtsman he used to sketch views which pleased him and his memory always brought back the entire landscape exactly If he thought of a con*versation a saying an engagement the place the people the entire scene rose before* his mind

His *auditory memory* was always deficient or at least secondary He had no taste for music

A year and a half previous to examination after business anxieties loss of sleep appetite etc he noticed suddenly one day an extraordinary change in himself *After* complete confusion there came a violent contrast between his old and his new state Everything about him seemed so new and foreign that at first he thought he must be going mad. *He was nervous and irritable Although he saw all things distinct* he had entirely lost his memory for forms and colors On ascertaining this he became reassured as to his sanity He soon discovered that he could carry on his affairs by using his memory in an altogether new way He can now describe clearly the difference between his two conditions

Every time he returns to A *from which place business often calls him* he seems to himself as if entering a strange city He views the monuments houses and streets with the same surprise as if he saw them for the first time Gradually however his *memory returns* and he finds himself at home again When asked to describe the principal public place of the town he answered I know that it is there but it is impos

[1] *Progrès médical* July 21 I abridge from the German report of the case in Wilbrand *Die Seelenblindheit* (1887)

Take the case of agraphia. An educated man kn wing how to write suddenl, l ses this power as a result of cerebral injury His hand and arm re in no way paralytic, yet he cann t write. Whence this loss f power? He tells us himself he no lo ger knows how He has forgotten how to set about it to trace the letters he has lost the memory of the mo ements to be execut d, he has no lo ger the motor images which when *formerly* he wr te, directed his hand. Other patients fle ted with word blindness resort to thes ... make amends for their other deficien y An indi placed befo e his yes e lo s f the power of rea patient has. Indi duals abo t way which they o the letters with their fi H w can the hand supply the place o ... p ... If th patient can r ... speak with his fingers it is because in tracing the letters he gi es himself ... of writing. In ne word, th graphic movements suggests the sen ... of what is ...

The imagination of a blind-deaf mute like Laura Bridgman must be con fined entirely to tactile and motor material. *All blind persons must belong to the tactile" and motile types* of the French authors When the young man whose cataracts were removed by Dr Franz was shown different geometric figures he said he had not been able to form from them the idea of a square and a disk until he percei ed a sensation of what he saw in the points of his fingers as if he really touched the objects

...

accompanied invariably by distinct muscular feelings in those parts of his body which would naturally be used in effectin, or in following the movement In

ment either in his own eyes or in his own limbs accompany them The move ments of articulate speech play a predominant part in his mental life.

When after my experimental w k I p oceed t ts description as a rule I rep oduce in the first instan e onl w ds, which I had already associated with the perception f the various details f the observation whilst the latter was going on. Fo speech plays in all my observing so important a part that I dinarily clothe phen mena in w ds as fast as I observe them.[3]

See an interesting case of a similar sort, reported by F rges, in *L Encéphale* th year p 545. *Philo phical T nsactions* 84 p. 65

Stricker *über die Sprachvorst llung* (880) and *Studien ber die Bew gungsvorstellung* (83)

Prof Stricker admits that by practice he has cceeded in making his eye-movements act vicariously for his leg movements in imagining men walking.

[3] *Bewegungsvorst* ... *ten*, p. 6.

spectator — Nothing more true said Scribe do you know where I am when I write a piece? In the middle of the parterre It is clear that the *pure audile* seeking to develop only a single one of his faculties may like the pure visualizer perform astounding feats of memory—Mozart for example noting from memory the *Miserere* of the Sistine Chapel after two hearings the deaf Beethoven composing and inwardly repeating his enormous symphonies On the other hand the man of auditory type like the visual is exposed to serious dangers for if he lose his auditory images he is without resource and breaks down completely

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soning and all their intellectual operations of images derived from movement In order to understand this important point it is enough to remember that all our per ceptions and in particular the important ones those of sight and touch contain a integral elements the movements of our eyes and limbs and that if movement i ever an essential factor in our really seeing an object it must be an equally essential factor when we ee the same object in imagination (Ribot)[1] For example the com plex impression of a ball which is there in our hand is the resultant of optical im pressions of touch of muscular adjustments of the eye of the movements of our fin ers and of the muscular sensations which the e yield When we imagine the ball its idea must include the images of these muscular sensations just as it includes tho e of the retinal and epidermal sensations They form so many *motor images* If they were not earlier reco nized to exist that is because our knowledge of the muscular sense is relatively so recent In older psychologies it never was mentioned the number of senses being restricted to five

There are persons who remember a drawing better when they have followed its out lines with their finger Lecoq de Boisbaudran used this means in his artistic teaching in order to accustom his pupils to draw from memory He made them follow the out lines of figures with a pencil held in the air forcing them thus to associate muscular with visual memory Galton quotes a curious corroborative fact Colonel Moncrieff often observed in North America young Indians who visiting occasionally his quarters interested themselves greatly in the engravings which were shown them One of them followed with care with the point of his knife the outline of a drawing in the *Illus trated London News* saying that this was to enable him to carve it out the better on his return home In this case the motor images were to reinforce the visual ones The young savage was a *motor* When one s motor images are destroyed one loses one s remembrance of movements and sometimes more curiously still one loses the power of executing them Patholo y gives us examples in motor aphasia agraphia etc.

[1] I am myself a very po r vi aliz r a d fin l th t I can s ld m c ll t m n l e n a sin le l tter of th alph bet in pu ly t nal te ms I m t tr ce th l tt r by ru ning my mental eye over its c ntour in ord that the image f it h ll h ve any distinctness at ll. On que t n ng a large numb of oth r people m stly stud nts I find that perhaps h lf of them sa th y have no s ch difficulty in see ng lett rs mentally Many affirm that they c n see an ent re word t nce pecially a short ne l ke d with n such fe lin of er at f th l tt rs s ccessi ely by t can them w ith the eye

[2] It i hardly needful t say that in modern primary educ ti n i which the blackboa d is o much used the children are taught their letters etc. by all possible channels at once si ht hearin and movem nt.

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1

the letters with their fi ger to und rstand their sense. What happens in such a case? How can the hand supply the place of the eye? The mot r image gi es the key to the p blem. If th patient can read, so to speak, with his fingers it is because in tracing th l tters he gives himself a rtain number of muscular impressions which are those of writing. In e wo d, the patient reads by writing (Charcot) the feeling of the graphic movements ugg ests the sense of what is being written as well as ght would.[1]

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Professor Stricker of Vienna who seems to have the motile form of imagina tion developed in unusual strength has given a very careful analysis of his own case in a couple of monographs with which all students should become familiar His recollections both of his own movements and of those of other things are accompanied in ariably by distinct muscular feelings in those parts of his body which would naturally be used in effecting or in following the movement In thinking of a soldier marching for example it is as if he were helping the image to march by marching himself in his rear And if he suppresses this sympathetic feeling in his own legs and concentrates all his attention on the imagined sol dier the latter becomes as it were paralyzed In general his imagined move-ments of whatsoeve objects seem paralyzed the moment no feelings of move-ment either in his own eyes or in his own limbs accompany them The move-ments of articulate speech play a predominant part in his mental life

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a certain order of hallucinations and perhaps of delirium

The *motor type* remains—perhaps the most interesting of all and certainly the one of which least is known Persons who belong to this type [*les moteurs* in French *motiles* as Mr Galton proposes to call them in English] make use in memory rea*soning and all their intellectual operations of images derived from movement* In order to understand this important point it is enough to remember that all our perceptions and in particular the important ones those of sight and touch contain as integral elements the movements of our eyes and limbs and that if movement i ever an essential factor in our really seeing an object it must be an equally essential *factor when we see the same object in imagination (Ribot)* [1] *For example the com*plex impres ion of a ball which is there in our hand is the resultant of optical impressions of touch of mu cular adjustments of the eye of the movements of our fin ers and of the muscular sensations which these yield When we imagine the ball its idea must include the images of these muscular en ations just as it include tho e *of the retinal and epidermal sensations They form so many motor images* If they were not earlier recognized to exist that is because our knowledge of the muscular sense is relatively so recent In older psychologies it never was mentioned the number of senses being restricted to five

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[2] It is hardly needful to say th t in modern primary e lu ti n in which the blackbo rd is o much used the child en are taught their letters etc., by all possible channels t once sight hearin *and movem nt.*

Touch images are very strong in some people The most vivid touch images come when we ourselves barely escape local injury or when we see another in jured The place may then actually tingle with the imaginary sensation—per haps not alto ether imaginary ince goose-flesh paling or reddening and other evi dences of actual muscular contraction in the spot may result

An educated man [says a writer who must always be quoted when t is a question of the powers f imaginati n] told me o ce that on entering his house one day he received a shock from crushing the finger f one of his little children in the door At the moment of his fright he felt a viole t pain in the correspo ding finger of his own body and this pain abode with him three days.

The same author makes the following discrimination which probably most men could verify

On th kin I easily succeed in bringing out suggested sensati ns wherever I will But because t is necessary t protract the mental effort I can only awaken such sensations as are in their nature prolonged, as warmth, cold pressure. Fleeting sensations as those f a prick, a cut, blow etc. I am unable t call up because I cannot imagine them *abrupto* with the requisite intensity The sensations of the former order I can excit upon any part of the skin and they may bec me so lively th t, whether I will or not, I have to pass my hand o er the place just as if it were a real impression on the skin

Meyer's account of his own visual images is very interesting and with it we may close our survey of differences between the normal powers of imagining in different individuals.

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taneously that there was yth g in his mind at all when h th ught, that I was m ch perple ed by his case I myself certainly ha e no ch vid pla I nascent m ements m to images as Professor Str cker describes. When I seek t represent row f soldiers marching all I catch is vi w f tati nary legs first in phase f mo ement and th n in another and thes ews are extremely impe fect and m mentary Occasionally (especially hen I try to stimulat my imaginati n, as by repeating Vict H g lines about th regi ment,

Leur pas st si orr t ons tarder ni ourir
Qu'on cr it voir d cise..ax ferme t trir)

I seem t get an instantaneous glimpse f an ctual mo ement, b t t is to th last degree dim and uncertain. All these images seem t first as if purely retinal. I think, h wever that rapid y m ements cc mpany them th u h these latt gi rise t such sli ht feelings that they ar almost impossible f d tecti n. Absol tely I g m vements of my wn are ther m f ct, t call such p rrests my imaginati f th soldi rs. My ptical ma es re in general very dim, dark, f gitive, and co tracted. It w uld be utte ly impossibl t *draw* from them, and yet I perfectly well distinguish ne from the *other* My dit ry images ar excessi ely inadequat rep od ctions f th ir riginals. I ha e *no* images f tast o smell. T ch imaginati is fairly distinct, b t omes ery little int play with most bjects th ught f Neither is all my th ht ve balized f I h h d wy schemes f relation as pt t terminat in od of the head an expulsi f th breath as in dennit word. On the wh le, vagu m...es sensati ns f mo ement insue f my h d t wards th n

See Tuke *I Influence f Mind pon Body* chaps. ii and vii. Meyer *p cit* p. 38.

Most persons on being asked *in what sort of terms they imagine words* will say in terms of hearing It is not until their attention is expressly drawn to the point that they find it difficult to say whether auditory images or motor images connected with the organs of articulation predominate A good way of bringing the difficulty to consciousness is that proposed by Stricker Partly open your mouth and then imagine any word with labials or dentals in it such as bubble, toddle Is your image under these conditions distinct? To most people the image is at first 'thick as the sound of the word would be if they tried to pronounce it with the lips parted Many can never imagine the words clearly with the mouth open others succeed after a few preliminary trials The experiment proves how dependent our verbal imagination is on actual feelings in lips tongue throat larynx etc

> When we recall the impression of a word or sentence if we do not speak it out we feel the twitter of the organs just about to come to that point The articulating parts —the larynx the tongue, the lips—are all sensibly excited a *suppressed articulation is in fact the material of our recollection* the intellectual manifestation the idea of speech [1]

The open mouth in Stricker s experiment not only prevents actual articulation of the labials but our feeling of its openness keeps us from imagining their articulation just as a sensation of glaring light will keep us from strongly imagining darkness In persons whose auditory imagination is weak the articulatory image seems to constitute the whole material for verbal thought Professor Stricker says that in his own case no auditory image enters into the words of which he thinks [2] Like most psychologists however he makes of his personal peculiarities a rule and says that verbal thinking is normally and universally an exclusively motor representation *I* certainly get auditory images both of vowels and of consonants in addition to the articulatory images or feelings on which this author lays such stress And I find that numbers of my students after repeating his experiments come to this conclusion There is *at first* a difficulty due to the open mouth That however soon vanishes as does also the difficulty of thinking of one vowel whilst continuously sounding another What probably remains true however is that most men have a less auditory and a more articulatory verbal imagination than they are apt to be aware of Professor Stricker himself has acoustic images and can imagine the sounds of musical instruments and the peculiar voice of a friend A statistical inquiry on a large scale into the variations of acoustic tactile and motor imagination would probably bear less fruit than Galton s inquiry into visual images A few monographs by competent observers like Stricker about their own peculiarities would give much more valuable information about the diversities which prevail [3]

[1] Bain *The Senses and the Intellect* p 339

[2] *Studien uber Sprachvorstellungen* pp 28 31 etc *Cf* pp 49–50 etc Against Stricker see Stumpf *Tonpsychol* 155–62 and *Revue philosophique* xx, p 617 See also Paulhan *Revue philosophique* xvi p 405 Stricker replies to Paulhan in vol. xviii p 685 P retorts in vol xix p 118 Stricker reports that out of 100 persons questioned he found only *one* who had *no* feeling in his lips when silently thinking the letters M B P and out of 60 only *two* who were conscious of no internal articulation whilst reading (*l* p 59–60)

[3] I think it must be admitted that some people have no vivid substantive images in any department of their sensibility One of my students an intelligent youth denied so pertl

would seem that in such a case the neural process corresponding to the imagination must be the entire tract concerned in the actual sensation even down as far as the retina This leads to a new question to which we may now turn—of what is

The Neural Process Which Underlies Imagination?

The commonly received idea is that it is only a milder degree of the same process which took place when the thing now imagined was sensibly perceived Professor Bain writes

d ffuses nerve currents through the inter or

through the same circles and op rate in the same way as during th act

f hel vin that in this self sustaining conditio the im

existenc f a sensati n existing fter the fact is e sentially the same as is m de existen during the fact. Now if this be the case with imp ess ons persi t g when ... ad pt c cerning imp ess o s r prod ced

w y that ts dentity can be p eserved a feeling differently embodied would be a different feeli g

It is not plain from Professor Bain s text whether by the same parts he means only the same parts *ns de the b n* or the same *peripheral* parts also

to run forward in the bra n and d scharge into the muscular system and the idea of a mo ement tends to do this with peculiar facility But the question remains Do currents run *b ckward* so that if the optical centres (for e ample) are exc ted by association and a visual object is imagined a current runs *dou to the et na* also and excites that sympathetically with the higher tracts? In other wo ds *can peripheral sense organs be excited from above or only from without? A e they excited n maginatio ?* Professor Ba n s instances are almost s lent as to this point All he says is this

dir th t inf vis lurer hk my lf can g t ch fter im ge N h I as y t eeded in getting rep rt f any f m my t dents Th S nses d th I t llect p 338

With much practice [he says] I have succeeded in making it possible for me to call up subjective visual sensations at will I tried all my experiments by day or at night with closed eyes At first it was very difficult In the first experiments which succeeded the whole picture was luminous the shadows being given in a somewhat less stron bluish light In later experiments I saw the objects dark with bright outlines or rather I saw outline drawings of them bright on a dark ground I can compare these drawings less to chalk *drawings on a blackboard than to drawings made with phos*phorus on a dark wall at night though the phosphorus would show luminous vapors which were absent from my lines If I wished for example to see a face without *intending that of a particular person I saw the outline of a profile against the dark* background When I tried to repeat an experiment of the elder Darwin I saw only the edges of the die as bright lines on a dark ground Sometimes however I saw the die really white and its edges black it was then on a paler ground I could soon at will change between a white die with black borders on a light field and a black die with white borders on a dark field and I can do this at any moment now After long prac tice these experiments succeeded better still I can now call before my eyes almost *any object which I please as a subjective appearance and this in its own natural color* and illumination I see them almost always on a more or less light or dark mostly dimly changeable ground Even known faces I can see quite sharp with the true color of hair and cheeks It is odd that I see these faces mostly in profile whereas *those* described [in the previous extract] were all full face Here are some of the final results of these experiments

1 Some time after the pictures have arisen they vanish or change into others with out *my being able to prevent it*

2 When the color does not integrally belong to the object I cannot always control it A face e g never seems to me blue but always in its natural color a red cloth *on the other hand I can sometimes change to a blue one*

3 I have sometimes succeeded in seeing pure colors without objects they then fill [illegible]

[illegible]

I once tried to see a brass sword hilt with a brass guard instead of [illegible] of a rapier guard appeared [illegible]

These experiments succeeded best when I lay quietly on my ba[illegible] eyes I could bear no noise about me as this kept the vision from attaining the requi[illegible] [illegible] th me now so easily that I am surprised [illegible]

The negative after images which succeeded upon Meyer s imagination when he opened his eyes are a highly interesting though rare phenomenon So far as I know there is only one other published report of a similar experience[2] It

[1] Meyer *op cit* pp. 238-41

[2] That of Dr Ch Féré in the *Revue philosophiq e* xx p 364 J han s M ller s [illegible] of hypnagogic hallucinations floating before the eyes for a few mom nts after these h d been opened seems to belong mor to the cat gory of spontaneous hallucin tions (see his *Phy iology* London 1842 p 1394) It is impossibl to tell whether the w ds in Wundt s *[illegible] su gen* I, p 387 refer to a personal experience of his own or n t pr bably not *[illegible]*

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>
> the c u e has cea d, what v w a e we to dopt co cerning imp ess ons r p by mental cau es al e w thout the aid of the original, as in ordinary recollecti n? \ f n 3ti of the brain with a resuscit ted feeling of resist a
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It is not plain from Professor Bain s text whether by the same parts he means only th same parts ns de the bra or the same *periphe al* parts also as those occup ed by the original feeling The examples wh ch he himself proceeds t gi e are almost all cases of imagination of *mo eme t* in which the peripheral organs are indeed affected for actual movements of a weak sort are found to accompany the dea. This is what we should expect. All currents tend to run forward in the brain and discharge into the muscular system and the idea of a movement tends to do this with peculiar facility But the question remains Do currents run *backward* so that if the optical centres (for example) are excited by association and a visual object is imagined a current runs *dow to the et na* also and excites that sympathetically with the higher tracts? In other words *c n peripheral sense g s be excited from abo e or only from without? A e they excited n m g nat on?* Professor Bain s instances are almost silent as to this point All he says is this

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3 I have sometimes succeeded in seeing pure colors without objects they then fill the entire field of view

4 I often fail to see objects which are not known to me mere fictions of my fancy and instead of them there will appear familiar objects of a similar sort for instance I once tried to see a brass sword hilt with a brass guard instead of which the more

my eyes and for a long while afterwards saw its after image

These experiments succeeded best when I lay quietly on my back and closed my eyes I could bear no noise about me as this kept the vision from attaining the requisite intensity The experiments succeed with me now so easily that I am surprised they did not do so at first and I feel as though they ought to succeed with everyone The important point in them is to get the image sufficiently intense by the exclusive direction of the attention upon it and by the removal of all disturbing impressions [1]

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To 2 The difference alleged is not absolute and sensation and imagination are hard to discriminate where the sensation is so weak as to be just perceptible At ni ht hearing a very faint striking of the hour by a far-off clock our imagination reproduces both rhythm and sound and it is often difficult to tell which was the last real stroke So of a baby crying in a distant part of the house we a 1 magine the sound Certain violin

l

fainter still than the preceding pianissimo This phen ... hearing

If we slowly approach our finger to a s about the moment in which the wetting himself to feel the knife of the surgeon w...

Visual perception supplies numberless instances in which the same sensation of vision is perceived as one object or another according to the interpretation of the mind I ll come before us in the course of the next two cl other sense subjects e has been cl sensation ... peripheral sensory processes are ord narily involved in imagination seems im pr bable that they may somet nes be a oused from the cortex downwards can not however be dogmatically de ied

The imagination process CAN *then pass over into the sensation process* In other words genuine sensations *can* be centrally originated When we come to

p ne d h will rese tl t ll y th t he ee bluish gree cross Th g in ss f 1

Delabarre

Th f ct emains, h w th t th g u e aft im ges f H rr Meyer M Féré d th h pn t subjects, I rm an ex ptı t all th t w kn w f rv -curr ts if th y are d t eff ent entrif gal current t th tina It may be that th y will her aft b ex plain d in me th w y M an bil w can nly w t them d wn as parad x. S g. Se gi theory that th is al fl t w e pe cepti h dly m nts seri sid u (*P ych log phy l g q* pp 99 89) S g th ry has rec tly b ffirmed th lm t dibl cr dity by Lombroso and Ott le ghi in th *R* *phdo-ph q* xix p. 7 (J n. 890) L tz *M d P y h* p 509

We might think of a blow on the hand until the skin were actually irritated and inflamed The attention very much directed to any part of the body as the great toe, for instance is apt to produce a distinct feeling in the part which we account for only by supposing a revived nerve current to flow there making a sort of false sensation an influence from within mimicking the influences from without in sensation proper (See the writings of Mr Braid of Manchester on Hypnotism etc)

If I may judge from my own experience all feelings of this sort are consecutive upon motor currents invading the skin and producing contraction of the muscles there the muscles whose contraction gives goose flesh when it takes place on an extensive scale I never get a *feeling* in the skin however stron ly I *imagine* it until some actual change in the condition of the skin itself has occurred The truth seems to be that the cases where peripheral sense-organs are directly excited in consequence of imagination are exceptional rarities if they exist at all *In common cases of imagination it would seem more natural to suppose that the seat of the process is purely cerebral and that the sense organ is left out* Reasons for such a conclusion would be briefly these

In imagination the *starting point* of the process must be in the brain Now

flow backward

2 There is between imagined objects and felt objects a difference of conscious quality which may be called almost absolute It is hardly possible to confound the liveliest image of fancy with the weakest real sensation The felt object has a plastic reality and outwardness which the imagined object wholly lacks Moreover as Fechner says in imagination the attention *feels as if drawn* backwards to the brain in sensation (even of after images) it is directed forward towards the sense organ [1] The difference between the two processes feels like one of kind and not like a mere more or less of the same [2] If a sensation of sound were only a strong imagination and an imagination a weak sensation there ought to be a border line of experience where we never *could* tell whether we were hearing a weak sound or imagining a strong one In comparing a present sensation felt with a past one imagined it will be remembered that we often judge the imagined one to *have been the stronger* (see above, p 326 note) This is inexplicable if the imagination be simply a weaker excitement of the sensational process

To these reasons the following objections may be made

To 1 The current demonstrably *does* flow backward down the optic nerve in Meyer s and Fere s negative after image Therefore it *can* flow backward therefore it *may* flow backward in some however slight degree in all imagination [3]

[1] See above p 484 note

[2] V Kandinsky (*Kritische u kl ische Bet acht ngen im Geb ete der S nnest u chungen* [Be li 1885] p 135 ff) insists that in even the l vel est pseudo hallucinations (see below Chapter xx) which ma d the t ns st possible res lts of the im ginati e process there is no outw
Abgrund separates these

[3] It seems to also flow
ject in the hypnotic tra
remove the imaginary cr

rents from the nei hboring cortical parts We can see in short why the *sensa tonal process* OUGHT TO *be discont nuous with all normal ideational processes however ntense* For as Dr Mun terberg justly observes

W e th re not this peculia arra gement we hould not distinguish reality and
j mm d t d to the f cts about us but ould be

cerebral mechanism

Mecha ween the ideational and the sensa

kinds of p

reached

can break through The current from the per p

required and what happens after the resistance is overcome is the ensational process We may suppose that the latter consists in some new and more violent sort of disintegration of the neural matter which now explodes at a deeper le el than at other times

Now how shall we conceive of the resistance which prevents this sort of disintegration from taking place this sort of intensity in the process from being attained so much of the time? It must be either an intrinsic resistance some force of cohes on in the neural molecules themselves or an extrinsic influence due to other cort Wh n w *come to tudy the process of hallucination*
we shall see that
inward molecula
inrush of destru
cess this energy
mi ht attain to
posed to be cons dering but sin
cates with others by association paths no uch accumulation can take place The cortical currents which run in run r ht out again awakenin the next ideas the le el of tension in the cells does not rise to the higher explos on point and the latter must be gained by a sudden current from the periphery or not at all

Die Willenshandl g (888) pp 9-40.

study hallucinations in the chapter on Outer Perception we shall see that this is by no means a thing of rare occurrence At present however we must admit that *normally the two processes do* NOT *pass over into each other* and we must inquire why One of two things must be the reason Either

1 Sensation processes occupy a different *locality* from imagination processes or

2 Occupying the same locality they have an *intensity* which under normal circumstances currents from other cortical regions are incapable of arousing and to produce which currents from the periphery are required

It seems almost certain (after what was said in Chapter II pp 32–34) *that the imagination process differs from the sensation process by its intensity rather than by its locality* However it may be with lower animals the assumption that ideational and sensorial centres are locally distinct appears to be supported by no facts drawn from the observation of human beings After occipital destruction the hemianopsia which results in man is sensorial blindness not mere loss of optical ideas Were there centres for crude optical sensation below the cortex the patients in these cases would still feel light and darkness Since they do not preserve even this impression on the lost half of the field we must suppose that there are no centres for vision of any sort whatever below the cortex and that the corpora quadrigemina and other lower optical ganglia are organs for reflex movement of eye muscles and not for conscious sight Moreover there are no facts which oblige us to think that within the occipital cortex one part is connected with sensation and another with mere ideation or imagination The pathological cases assumed to prove this are all better explained by disturbances of conduction between the optical and other centres (see p 33) In bad cases of hemianopsia the patient s images depart from him together with his sensibility to light They depart so completely that he does not even know what is the matter with him To perceive that one is blind to the right half of the field of view one must have an idea of that part of the field s possible existence But the defect in these patients has to be revealed to them by the doctor they themselves only knowing that there is something wrong with their eyes What you have no idea of you cannot miss and their not definitely missing this great region out of their sight seems due to the fact that their very idea and memory of it is lost along with the sensation A man blind of his eyes merely sees *darkness* A man blind of his visual brain centres can no more see darkness out of the parts of his retina which are connected with the brain lesion than he can see it o
of the field and he c
for the very notion c
mind [1]

Now if we admit that sensation and imagination are due to the activity of the same centres in the cortex we can see a very good teleological reason why they should correspond to discrete kinds of process in these centres and why the process which gives the sense that the object is really there ought normally to be arousable only by currents entering from the periphery and not by cur

[1] See an important article by Binet in the *Revue philosophique* XXVI p 481 (1888) also Dufour in *Revue méd de la Suisse romande* 1889 No 8 cited in the *Neurologisches Centralblatt* 1890 p 48

number of them, are so closely combined by association that they appear not one idea, but one sensation.[1]

This passage from James Mill gives a clear statement of the doctrine which Berkeley in his Theory of Vision made for the first time an integral part of Psychology. Berkeley compared our visual sensations to the words of a language, which are but signs or occasions for our intellects to pass to what the speaker means. As the sounds called words have no inward affinity with the ideas they signify, so neither have our visual sensations, according to Berkeley, any inward affinity with the things of whose presence they make us aware. These things are *tangibles*; their real properties, such as shape, size, mass, consistency, position, reveal themselves only to touch. But the visible signs and the tangible significates are by long custom so "closely twisted, blended, and incorporated together, and the prejudice is so confirmed and riveted in our thoughts by a long tract of time, by the use of language, and want of reflection,"[2] that we think we *see* the whole object, tangible and visible alike, in one simple indivisible act.

Sensational and reproductive brain-processes combined, then, are what give us the content of our perceptions. Every concrete particular material thing is a conflux of sensible qualities, with which we have become acquainted at various times. Some of these qualities, since they are more constant, interesting, or practically important, we regard as essential constituents of the thing. In a general way, such are the tangible shape, size, mass, etc. Other properties, being more fluctuating, we regard as more or less accidental or inessential. We call the former qualities the reality, the latter its appearances. Thus, I hear a sound, and say "a horse-car"; but the sound is not the horse-car, it is one of the horse-car's least important manifestations. The real horse-car is a feelable, or at most a feelable and visible, thing which in my imagination the sound calls up. So when I get, as now, a brown eye-picture with lines not parallel, and with angles unlike, and call it my big solid rectangular walnut library-table, that picture is not the table. It is not even like the table as the table is for vision, when rightly seen. It is a distorted perspective view of three of the sides of what I mentally *perceive* (more or less) in its totality and undistorted shape. The back of the table, its square corners, its size, its heaviness, are features of which I am conscious when I look, almost as I am conscious of its name. The suggestion of the name is of course due to mere custom. But no less is that of the back, the size, weight, squareness, etc.

Nature, as Reid says, is frugal in her operations, and will not be at the expense of a particular instinct to give us that knowledge which experience and habit will soon produce. Reproduced sights and contacts tied together with the present sensation in the unity of a *thing* with a name, these are the complex objective stuff out of which my actually perceived table is made. Infants must go through a long education of the eye and ear before they can perceive the realities which adults perceive. *Every perception is an acquired perception.*[3]

[1] Analysis, I, p. 97. [2] Theory of Vision, p. 51.

[3] The educative process is particularly obvious in the case of the ear, for all sudden sounds seem alarming to babies. The familiar noises of house and street keep them in constant trepidation until such time as they have either learned the objects which emit them, or have become hardened to them by frequent experience of their innocuity.

Chapter XIX

THE PERCEPTION OF "THINGS"

Perception and Sensation Compared

A PURE sensation we saw above p 456, to be an abstraction never realized in adult life Any quality of a thing which affects our sense organs does also more than that it arouses processes in the hemispheres which are due to the organization of that organ by past experiences and the results of which in consciousness are commonly described as ideas which the sensation suggests The first of these ideas is that of the *thing* to which the sensible quality belongs *The consciousness of particular material things present to sense* is nowadays called *perception*[1] The consciousness of such things may be more or less complete it may be of the mere name of the thing and its other essential attributes or it may be of the thing s various remoter relations It is impossible to draw any sharp line of distinction between the barer and the richer consciousness because the moment we get beyond the first crude sensation all our consciousness is a matter of suggestion and the various suggestions shade gradually into each other, being one and all products of the same psychological machinery of association In the directer consciousness fewer in the remoter more associative processes are brought into play

Perception thus differs from sensation by the consciousness of farther facts associated with the object of the sensation

When I lift my eyes from the paper on which I am writing I see the chairs and tables and walls of my room each of its proper shape and at its proper distance I see from my window trees and meadows and horses and oxen and distant hills I see each of its proper size of its proper form and at its proper distance and these particulars appear as immediate informations of the eye as the colors which I see by means of it Yet philosophy has ascertained that we derive nothing from the eye whatever but sensations of color How then is it that we receive accurate information by the eye of size and shape and distance? By association merely The colors upon a body are different according to its figure its shape and its size But the sensations of color and what we may here for brevity call the sensations of extension of figure of distance have been so often united felt in conjunction that the sensation of

—a sequence in which the antecedent a sensation of color and the consequent a

[1] The word *percept o* h wever has been variously used For historical notices see H m ilton s *Lectures on Metaphysics* ii p 96 For Hamilton perc ption is the conscio sness of external objects (*ibid* p 28) Spencer defines it oddly en ugh as a d scerning of the relation or relations between *states of co sciousn ss* partly pr sentative and partly representative which states of consciousness must be themselves known to the extent invol d in the knowledge of their relations (*Psychol* § 355)

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Analysis, I, p. 97. *Theory of Vision*, p. 5.

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THE PERCEPTION OF "THINGS"

Perception and Sensation Compared

A PURE sensation we saw above p 456 to be an abstraction never realized in adult life Any quality of a thing which affects our sense organs does also more than that it arouses processes in the hemispheres which are due to the organization of that organ by past experiences and the results of which in consciousness are commonly described as ideas which the sensation suggests The first of these ideas is that of the *thing* to which the sensible quality belongs *The consciousness of particular material things present to sense* is nowadays called *perception*[1] The consciousness of such things may be more or less complete it may be of the mere name of the thing and its other essential attributes or it may be of the thing s various remoter relations It is impossible to draw any sharp line of distinction between the barer and the richer consciousness because the moment we get beyond the first crude sensation all our consciousness is a matter of suggestion and the various suggestions shade gradually into each other being one and all products of the same psychological machinery of association In the directer consciousness fewer in the remoter more associative processes are brought into play

Perception thus differs from sensation by the consciousness of farther facts associated with the object of the sensation

When I lift my eyes from the paper on which I am writing I see the chairs and tables and walls of my room each of its proper shape and at its proper distance I see from my window trees and meadows and horses and oxen and distant hills I *see each of its proper size of its proper form and at its proper distance* and these particulars appear as immediate informations of the eye as the colors which I see by means of it Yet philosophy has ascertained that we derive nothing from the eye whatever but sensations of color How then is it that we receive accurate information by the eye of size and shape and distance? By association merely The colors upon a body are different according to its figure its shape and its size But the sensations of color and what we may here for brevity call the sensations of extension of figure of distance have been so often united felt in conjunction that the sensation of the color is never experienced without raising the ideas of the extension the figure the distance in such intimate union with it that they not only cannot be separated but are actually supposed to be seen The sight as it is called of figure or distance appearing as it does a simple sensation is in reality a complex state of consciousness —a sequence in which the antecedent a sensation of color and the consequent a

[1] The word *perception* however has been variously used For historical notices see Hamilton s *Lectures on Metaphysics* II p 96 For Hamilton perception is the consciousness of external objects (*ibid* p 28) Spencer defines it oddly enough as a discerning of the relation or relations between *states of consciousness* partly presentative and partly representative which states of consciousness must be themselves known to the extent involved in the knowledge of their relations (*Psychol* § 355)

number of ideas are so closely combined by association that they ppear not one idea but o e ensat on

This passage from James Mill gives a clear tatement of the doctrine which Berkeley in his Theory of Vision made for the first time an integral part of Psychology Berkeley compared our visual sensations to the words of a language which are but s gns or occasions for our intellects to pass to what the speaker means As the sounds called words have no inward affin ty with the ideas they signify so neither have our visual sensations according to Berkeley any inward affinity with the things of whose presence they make us aware Those things are *tang bles* their real properties uch as shape size mass consistency posit on reveal themselves only to touch But the visible signs and the tangible s gnificates are *by long custom so closely twisted blended and* incorporated together and the prejud ce is so confirmed and riveted in our thou hts by a long tract of time by the use of language and want of reflec tion that we think we *see* the whole object tangible and visible alike in one s mple indivisible act

Sensational and reproductive brain processes combined then are what gi e us the content of our perceptions Every concrete particular material thing is a conflux of sensible qualities with which we have become acquainted at vari ous times Some of these qualities since they are more constant interesting or practically important we regard as essential constituents of the thin In a gen eral way such are the tangible shape size mass etc Other propertie being m re fluctuating we regard as more or less accidental or inessential We call the former qualities the reality the latter its appearances Thus I hear a sound d t the horse-car it is one of the horse-

when I get as
unlike and ca

of the table its square corners its size its nea

c nscious when I look almost as I am conscious of its name The suggestion of the name is f course due to mere custom But no less is that of the back the s ze we ght squareness etc

Natu e as Reid says is frugal in her operations and will not be at the expense of a particular instinct to gi e us that knowledge which experience and habit w ll soon produce Reproduced ghts and contacts tied to ether with the p es ent sensation in the unity of a *th ng* with a name these are the complex objec ti e stuff out of which my actually pe ceived table is made Infants must o th ou h a long educat on of the eye and ear befo e they can perceive the realities which adults perceive. *Every perception is an acquired perception*[2]

Analysis I, p 97 *Th ory f Vis* p. 5

The ed cati process is particularly b ous in th case f th ear fo all s dden sounds seem alarmi g t babies The familiar es f h use and treet k p th m in tant trepidatio til th tim as th y ha eith learn d th bj cts wh ch emit them ha e become blunted t th m by freq ent experi ce f their innocuity

Chapter XIX

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sound very different to us if we heard it without understanding, as we hear a foreign tongue. Rises and falls of voice, odd sibilants and other consonants, would fall on our ear in a way of which we can now form no notion. Frenchmen say that English sounds to them like the *gazouillement des oiseaux*—an impression which it certainly makes on no native ear. Many of us English would describe the sound of Russian in similar terms. All of us are conscious of the strong inflections of voice and explosives and gutturals of German speech in a way in which no German can be conscious of them.

This is probably the reason why, if we look at an isolated printed word and repeat it long enough, it ends by assuming an entirely unnatural aspect. Let the reader try this with any word on this page. He will soon begin to wonder if it can possibly be the [illegible] his life with that meaning.
It stares at him from [illegible]
body is indeed there [illegible]
tending to it to its [illegible]
way but habitually got it clad with its meaning the moment we [illegible]
it and rapidly passed from it to the other words of the phrase. We apprehended it, in short, with a cloud of associates, and thus perceiving it, we felt it quite o[illegible] [illegible] and alone.

[illegible]

their diminution, the colors grow [illegible]
light and shade more marked. The same thing occurs when we turn a painting bottom upward. We lose much of its meaning, but, to compensate for the loss, we feel more freshly the value of the mere tints and shadings, and become aware of any lack of purely sensible harmony or balance which they may show. Just [illegible] look up at the mouth of a person talking, behind [illegible]
return [illegible]
a mouth [illegible]
turbed by the unaccustomed point of view) we get it as a [illegible]
not as part of a familiar object perceived.

On a later page other instances will meet us. For the present these are enough to prove our point. Once more we find ourselves driven to admit that when qualities of an object impress our sense and we thereupon perceive the object, the sensation as such of those qualities does not still exist inside of the perception and form a constituent thereof. The sensation is one thing and the perception another, and neither can take place at the same time with the other, because their cerebral conditions are not the same. They may resemble each other, but in no respect are they identical states of mind.

Cf. Helmholtz, *Optik*, pp. 433, [illegible] and Spencer, *Psychology*, vol. II, p. [illegible]
note.

Perception may then be defined in Mr Sully s words as that process by which the mind

supplements a sense impression by an accompaniment or escort of revived sensations the whole aggregate of actual and revived sensations being solidified or integrated into the form of a percept that is an apparently immediate apprehension or cognition of an object now present in a particular locality or region of space [1]

Every reader s mind will supply abundant examples of the process here described and to write them down would be therefore both unnecessary and tedious In the chapter on Space we have already discussed some of the more interesting ones for in our perceptions of shape and position it is really difficult to decide how much of our sense of the object is due to reproductions of past experience and how much to the immediate sensations of the eye I shall accordingly confine myself in the rest of this chapter to certain additional generalities connected with the perceptive process

The first point is relative to that solidification or ' integration whereof Mr Sully speaks of the present with the absent and merely represented sensations Cerebrally taken these words mean no more than this that the process aroused in the sense organ has shot into various paths which habit has already organized in the hemispheres and that instead of our having the sort of consciousness which would be correlated with the simple sensorial process we have that which is correlated with this more complex process This as it turns out is the consciousness of that more complex object the whole thing instead of being the consciousness of that more simple object the few qualities or attributes which actually impress our peripheral nerves This consciousness must have the unity which every section of our stream of thought retains so long as its objective content does not sensibly change More than this we cannot say we certainly ought not to say what usually is said by psychologists and treat the perception as a sum of distinct psychic entities the present sensation namely *plus* a lot of images from the past all integrated together in a way impossible to describe The perception is one state of mind or nothing—as I have already so often said

In many cases it is easy to compare the psychic results of the sensational with those of the perceptive process We then see a marked difference in the way in which the impressed portions of the object are felt in consequence of being cognized along with the reproduced portion in the higher state of mind Their sensible quality changes under our very eye Take the already quoted catch *Pas de lieu Rhone que nous* one may read this over and over again without recognizing the sounds to be identical with those of the words *paddle your own canoe* As we seize the English meaning the sound itself appears to change Verbal sounds are usually perceived with their meaning at the moment of being heard Sometimes however the associative irradiations are inhibited for a few moments (*the mind being preoccupied with other thoughts*) whilst the words linger on the ear as mere echoes of acoustic sensation Then usually their interpretation suddenly occurs But at that moment one may often surprise a change in the very *feel* of the word Our own language would

[1] *Outlines* p 153

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This is probably the reason why if we look at an isolated printed word and repeat it long enough it ends by assumin, an entirely unnatural aspect Let the reader try this with any word *on this page* He will soon begin to wonder if it can possibly be the word he has been using all his life with that meaning It stares at him from the paper like a glass eye with no speculation in it Its body is indeed there but its soul is fled It is reduced by this new way of at tend ng to it to its sensational nudity We never before attended to it in this way but habitually got it clad with its meaning the moment we cau ht sight of it and rap dly passed from it to the other words of the phrase We apprehended it in short with a cloud of associates and thus perceiving it we felt it quite otherwise than as we feel it now divested and alone

Another well known change is when we look at a landscape with our head upside down Perception is to a certain extent baffled by this manœuvre grada tions of distance and other space determinations are made uncertain the reproductive or associative processes in short, decline and simultaneously with their diminution the colors grow richer and more varied and the contrasts of light and shade more marked The same thing occurs when we turn a painting bottom upwa d We lose much of its meanin but to compensate for the loss we feel *more f eshly* the value of the me e tints and shadings and become aware of any lack of purely sensible harmony or balance which they may show Just so if we lie on the floor and look up at the mouth of a person talking be-h nd us

retina

a mobu y

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[1] *Outl es* p 153

to when passed through the heau tnese

ld probably suggest objects Many years

words vis

cernible to an attention on the watch for them A horse s heau a cou anchor are for example ideas which have come to me unsolicited whilst I have been writin these latter lines They can often be explained by subtle links of association often not at all But I have not a few times been surprised after noting some such idea to find on shutting my eyes an after image left on the retina by some bright or dark object recently looked at and which had evidently suggested the idea Evider

and position of object thought of

the idea had details which the retinal mage

know just what part retinal after images play in determining the train of our thoughts Judging by my own experiences I should suspect it of being not in significant

[1] Th m less g m t cally gular phantasms which ar p d ced by press e n the y balls g u f th h d nhal u f anæ th tics tc might gain b cit d t p ... e transf rmed into fig d bjects b

m untains, wh se col aned cco ding t their seve l lut des d h u betw let, b wn and dark gree and I h d f tigued myself to purpo when I eased l k ing and t rned w y At th t m ment I saw b f m (I cann t coll t wh th my y er sh t pen) th figur f an bse t fri d lik rps I asked myself t h w I had me t think f my bsent frie d —I f w seco ds I gained th thread f

Perception Is of Definite and Probable Things

The chief cerebral conditions of perception are the paths of association irradiating from the sense impression which may have been already formed If a certain sensation be strongly associated with the attributes of a certain thing that thing is almost sure to be perceived when we get the sensation Examples of such things would be familiar people places etc which we recognize and name at a glance But *where the sensation is associated with more than one reality* so that either of two discrepant sets of residual properties may arise the perception is doubtful and vacillating and *the most that can then be said of it is that it will be of a* PROBABLE *thing* of the thing which would most usually have given us that sensation

In these ambiguous cases it is interesting to note that perception is rarely abortive *some* perception takes place The two discrepant sets of associates do not neutralize each other or mix and make a blur What we more commonly get is first one object in its completeness and then the other in its completeness. In other words *all brain processes are such as give rise to what we may call* FIGURED *consciousness* If paths are irradiated at all they are irradiated in consistent systems and occasion thoughts of definite objects not mere hodgepodges of elements Even where the brain s functions are half thrown out of gear as in aphasia or dropping asleep, this law of figured consciousness holds good A person who suddenly gets sleepy whilst reading aloud will read wrong but instead of emitting a mere broth of syllables he will make such mistakes as to read supper time instead of sovereign overthrow instead of opposite or indeed utter entirely imaginary phrases composed of several definite words instead of phrases of the book So in aphasia where the disease is mild the patient s mistakes consist in using entire wrong words instead of right ones Only in the gravest lesions does he become quite inarticulate These facts show how subtle is the associative link how delicate yet how strong that connection among brain paths which makes any number of them once excited together, *thereafter tend to vibrate as a systematic whole* A small group of elements *this* common to two systems A and B may touch off A or B according as accident decides the next step (see Fig 47) If it happen that a single point lead

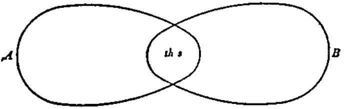


FIG 47

ing from *this* to B is momentarily a little more pervious than any leading from *this* to A then that little advantage will upset the equilibrium in favor of the entire system B The currents will sweep first through that point and thence into all the paths of B each increment of advance making A more and more impossible The thoughts correlated with A and B in such a case will have ob-

I will give briefly a number of examples under each head The first head is the more important because it includes a number of constant illusions to which all men are subject and which can only be dispelled by much experience

Illusions of the First Type

One of the oldest instances dates from Aristotle Cross two fingers and roll a pea penholder or other small object between them It will seem double Professor Croom Robertson has given the clearest analysis of this illusion He observes that if the object be brought into contact first with the fore finger and next with the second finger the two contacts m to come in at different points of space The fore ger is re. though the fin er is really u contacts as double because we refer them to two distinct parts of space The touched sides of the two fingers are normally not to ether in space and customarily never do touch one thing the one thin which now touches them therefore seems in two



F 48

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pictures as these Wheatstone s instrument the *pseudoscope* allows us to look at sol d objects and see w th each eye the other eye s picture We then perceive th solid object hollow *f t be an object wh cl m ght p obably be hollow* but

soc ati n For the same reason it is very easy to make an nta lio cast of a face or the painted ins de of a pasteboard mask look convex instead of concave as they are

Th illusi is h d t bri g b t Th p int and *b* being m lly in ta t, meant us th sam p and h ce t might b pp d th t when simulta usly t ched, as by pair f callipe sh ld feel b t bject whil t as m tt f f t w feel t It sh uld b rem ked in plan ti f this th t bject pla d b twee th t fing rs in their rmal uncr ssed positi lw y wak ns th sense f *tw* t t Wh th fing rs are *pr d t g th w f l bj t t b betw* th m And wh n th fi g rs crossed and their correspo ding p ints and *b* simultaneo sly *p* d w d g t something lik th illusi f singl ness—th t is, w g t ry d btful d bl ess

Illusions

Let us now for brevity's sake treat A and B in Fig 47 as if they stood for

have called *this* but that on the present occasion A and not B is the one which actually does so If then on this occasion *this* suggests A and not B the result is a *correct perception* But if on the contrary this suggests B and not A the result is a *false perception* or as it is technically called an *illusion* But the *process* is the same whether the perception be true or false

Note that in every illusion what is false is what is inferred not what is immediately given The this if it were felt by itself alone would be all right it only becomes misleading by what it suggests If it is a sensation of sight it may suggest a tactile object for example which later tactile experiences prove to be not there *The so called fallacy of the senses of which the ancient sceptics made so much account is not fallacy of the senses proper but rather of the intellect which interprets wrongly what the senses give*[1]

So much premised let us look a little closer at these illusions They are due to two main causes *The wrong object is perceived either because*

1) *Although not on this occasion the real cause it is yet the habitual inveterate or most probable cause of this or because*

2) *The mind is temporarily full of the thought of that object and therefore this is peculiarly prone to suggest it at this moment*

---

corpse Ho was this?—At this moment whether th ugh fatigue o in order to think I closed my eyes and found at once the whole field of sight over a considerable extent covered

s ns t p an u red ho v it was th t d surrou ding them the sam color But it was then too lat or pe haps the i fluence of flecti and am n tion had b en t o

The exce sive excit tion f the periphery of the ptic n e I m an the lo g co tinue i p e c ding sensat n of my eyes w h n c ntempl ting the color of the mountain h d i dir ctly p ovoked a s bjecti e and durable nsat o that of the c mplementary color and my rem niscence ncorporati g itself with this s bj ctive sensat on became the c rpse like pha tom I have described

[1] *Cf* Th R d *Intellect al Powe s* essay ii chap xxii nd A Binet in *M d* ix p 206 M Binet points out the fact th t wh t is fall ciously inf r ed is lways an object of some other sen e than th th s Optical illus o s are g n lly e rors of tou h and muscular sensib lity and the fallaciously perce ed object and the e periences which cor ct it are both tactile in these cases

interpret as attempts to pursue and catch again those parts of the object which have been slipping away to the left.

Exactly similar oscillations of the eyeballs are produced in *giddiness* with exactly similar results. Giddiness is easiest produced by whirling on our heels. It is a feeling of the movement of our own head and body through space and is now pretty well understood to be due to the irritation of the semi-circular canals of the inner ear. When after whirling we stop we seem to be spinning in the reverse direction for a few seconds, and then objects appear to continue whirling in the same direction in which a moment previous, our body actually whirled. The reason is that our *eyes normally tend to maintain* their field of view. If we suddenly turn our head leftwards it is hard to make the eyes follow. They roll in their orbits rightwards by a sort of compensating inertia. Even though we *falsely think* our head to be moving leftwards this consequence occurs and our eyes move rightwards—as may be observed in any one with vertigo after whirling. As these movements are unconscious the retinal movement feelings which they occasion are naturally referred to the objects seen. And the intermittent voluntary twitches of the eyes towards the left, by which we ever and anon recover them from the extreme rightward positions to which the reflex

out after a few seconds. And it often ceases if we voluntarily fix our eyes upon a given point.

Objective vertigo as these illusions of objective movement are called results sometimes from brain trouble intoxications paralysis etc. A man will awaken with a weakness of one of his eye-muscles. An intended orbital rotation will then not produce its expected result in the way of retinal movement feeling—whence false perceptions of which one of the most interesting cases will fall to be discussed in later chapters.

There is an illusion of movement of the opposite sort, with which everyone is familiar at *railway stations*. Habitually when we ourselves move forward our entire field of view glides backward over our retina. When our movement is due to that of the windowed carriage car or boat in which we sit, all stationary objects visible through the window give us a sensation of gliding in the opposite direction. Hence whenever we get this sensation, of a window with *all* objects visible through it moving in one direction, we react upon it in our customary way and perceive a stationary field of view over which the window and we ourselves inside of it are passing by a motion of our own. Consequently when another train comes alongside of ours in a station, and fills the entire win

Purkinje, Mach, and Breuer are the authors to whom we mainly owe the explanation of the feeling of vertigo. I have found (*American Journal of Otology*, Oct. 1882) that in deaf-mutes (whose semi-circular canals or entire auditory nerves must often be destroyed) there very frequently exists no susceptibility to giddiness or whirling.

The involuntary character of the eye-movements is not the only cause of the false perception in these cases. There is also a true negative after-image of the original retinal movement-sensations, as we shall see in Chapter XX.

Our sense of the *position* of things with respect to our eye consists in suggestions of how we must move our hand to touch them Certain places of the image on the retina certain actively produced positions of the eyeballs are normally linked with the sense of every determinate position which an outer thing may come to occupy Hence we perceive the usual position even if the optical sensation be artificially brought from a different part of space Prisms warp the light rays *in this way and throw upon the retina the image of an object situated* say, at spot *a* of space in the same manner in which (without the prisms) an object situated at spot *b* would cast its image Accordingly we feel for the object at *b* instead of *a* If the prism be before one eye only we see the object at *b* with that eye and in its right position *a* with the other—in other words, we see it double If both eyes be armed with prisms with their angle towards the right we pass our hand to the right of all objects when we try rapidly to touch them And this illusory sense of their position lasts until a new association is fixed when on removing the prisms a contrary illusion at first occurs Passive or unintentional changes in the position of the eyeballs seem to be no more kept account of by *the mind than prisms are so we spontaneously make no allowance for them in* our perception of distance and movements Press one of the eyeballs into a strained position with the finger and objects move and are translocated accordingly just as when prisms are used

Curious *illusions of movement* in objects occur whenever the eyeballs move without our intending it We shall learn in the following chapter that the original visual feeling of movement is produced by any image passing over the retina Originally however this sensation is definitely referred neither to the object nor to the eyes Such definite reference grows up later and obeys certain simple laws We believe objects to move 1) whenever we get the retinal movement *feeling but think our eyes are still and 2) whenever we think that our eyes* move but fail to get the retinal movement feeling We believe objects to be still on the contrary 1) whenever we get the retinal movement feeling but think our eyes are moving and 2) whenever we neither think our eyes are moving nor get the retinal movement feeling Thus the perception of the object s state of motion or rest depends on the notion we frame of our own eye s movement Now many sorts of stimulation make our eyes move without our knowing it If we look at a waterfall river railroad train or any body which continuously passes in front of us in the same direction it carries our eyes with it This movement can be noticed in our eyes by a bystander If the object keep passing *towards our left our eyes keep following whatever moving bit of it may have* caught their attention at first until that bit disappears from view Then they jerk back to the right again and catch a new bit which again they follow to the left and so on indefinitely This gives them an oscillating demeanor slow involuntary rotations leftward alternating with rapid voluntary jerks rightward *But these oscillations continue* for a while after the object has come to a stand

ward automatic movements of our eyeballs and think that the retinal movement sensations thereby aroused must be due to a rightward motion of the object seen whilst the rapid voluntary rightward movements of our eyeballs we

ever object approaches us and reducing it in imagination to its natural size Similarly in the theatre the glass brings the sta e near but hardly seems to magnify the people on it

The well known increased *apparent si e of the moon on the hori on* is a result of association and probability It is seen through vaporous air and looks dimmer and duskier than when it rides on high and it is seen over fields trees hedges streams and the like which break up the intervening space and make
ι ‹ Both these causes make the moon seem
ι

a house or tree distant enough to subtend
moon itself

The feeling of accommodation also gives rise to false perceptions of size Usually we accommodate our eyes for an object as it approaches us Usually under these circumstances the object throws a larger retinal image But believing the object to remain the same we make allowance for this and treat the entire eye-feeling which we receive as significant of nothin but *approach* When we relax our accommodation and at the same time the retinal image grows
¹ e always a *receding object* The moment we put on

certain acillation as to the recession for the growth in apparent size is also a probable s gn of approach and is at moments interpreted accordingly —Atropin
r ¹ h mus les of accommodation It is possible to get a dose which will

peak again in the ensuing chapter

Mrs C L Franklin has recently described and explained with rare acuteness an illusion of which the most curious thin is that t was never noticed be-

C/ B ι ι Th ry f ι ... §§ 67 9 H lmh ltz Physi l gis h Optik pp 630–
3 Lech las in Rev phil ph que xxvi, p 49
Phy l Op k p 60

It seems lik ly th t th st ins in th ecti muscles h som thing t d with the vacillating j dgm t in these tr pin cases. Th int rnal ecti tract wh ne w cc mmodate They squint and p od ce d bl ısi when th inn rvati f mmod ti is ... T se singly h t aim g th tr pinized cc mm dati n, th co tracti n f int rnal ecti must be t lir d by rrespo dingly ssi tra ti n f th ternal recti. B t this is gn f th bject ssi n, etc.

dow and after standing still awhile begins to glide away we judge that it is *our* train which is moving and that the other train is still If, however we catch a glimpse of any part of the station through the windows or between the cars of the other train the illusion of our own movement instantly disappears and we perceive the other train to be the one in motion This again is but making the usual and probable inference from our sensation [1]

Another illusion due to movement is explained by Helmholtz Most wayside objects houses trees etc look small when seen out of the windows of a swift train This is because we perceive them in the first instance unduly near And we perceive them unduly near because of their extraordinarily rapid parallactic flight backwards When we ourselves move forward all objects glide backwards as aforesaid but the nearer they are the more rapid is this apparent translocation Relative rapidity of passage backwards is thus so familiarly associated with nearness that when we feel it we perceive nearness But with a *given size of retinal image the nearer an object is the smaller do we judge its* actual size to be Hence in the train the faster we go the nearer do the trees and houses seem and the nearer they seem the smaller do they look [2]

Other illusions are due to the feeling of convergence being wrongly interpreted When we converge our eyeballs we perceive an *approximation* of whatever thing we may be looking at Whatever things do approach whilst we look at them oblige us so long as they are not very distant to converge our eyes Hence approach of the thing is the *probable* objective fact when we feel our eyes converging Now in most persons the internal recti muscles to which convergence is due are weaker than the others and the entirely passive position of the eyeballs the position which they assume when covered and looking at nothing in particular is either that of parallelism or of slight divergence Make *a person look with both eyes at some near object and then screen the object* from *one* of his eyes by a card or book The chances are that you will see the eye thus screened turn just a little outwards Remove the screen and you will now see it turn in as it catches sight of the object again The other eye meanwhile keeps as it was at first To most persons accordingly all objects seem to *come nearer* when after looking at them with one eye both eyes are used and they seem to *recede* during the opposite change With persons whose external recti muscles are insufficient the illusions may be of the contrary kind

The size of the retinal image is a fruitful source of illusions Normally the retinal image grows larger as the object draws near But the sensation yielded by this enlargement is also given by any object which really grows in size without changing its distance Enlargement of retinal image is therefore an ambiguous sign An opera glass enlarges the moon But most persons will tell you that she looks smaller through it only a great deal nearer and brighter They read *the enlargement* as a s
them actually reverse
our habitual custom of

[1] We never so far as I know get the converse illu ion at a rail oad station and believe the other t ain to move hen t is still [2] Helmholtz *Phys ol Opt k* p 365

another sort altogether and that associative processes strictly so called have nothing to do with their production.

Illusions of the Second Type

We may now turn to illusions of the second of the two types discriminated on page 508 In this type we perceive a wrong object because our mind is full of the thought of it at the time and any sensation which is in the least degree connected with it touches off as it were a train already laid and gives us a sense really before us. Here is a familiar example

If
color
than ...
the other qualities of a woodcock and is afterwards disgusted ...
a thrush. I have d e so myself and could hardly belie e that the thrush was the bird I had fired t, so complete was my mental supplement to my visual perception.[1]

As with game so with enemies ghosts and the like Anyone waiting in a dark place and expecting or fearing strongly a certain object will interpret any abrupt sensation to mean that object s presence The boy playing I spy the criminal skulking from his pursuers the superstitious person hurrying through the woods or pas ... m d ght the man lost in the woods the girl who tremu
to illu
pelled twenty times a day ...
occup ed fancy will think he percei es his idol s bonnet before him

The Proof reader's Illusion I remember one night in Boston whilst waiting for a Mount Auburn car to brin me to Cambrid e reading most distinctly that name upon the s gnboard of a car on which (as I afterwards learned) North A enue was painted The illusion was so vivid that I could hardly be lie e my eyes had deceived me. All reading is more or less performed in this way

Practised el newspaper readers could not poss b get n so fast if they had t curatel every ind lett of every w d m d r to per ei e the w rds. M e than half f the w ds com ut f their mind, and hardly half f om the printed pa. Wer this n t so did we pe cei e each letter by itself typographic err rs in ... kn wn wo ds w uld ever be e looked. Children wh se deas ar n t yet eady ... t pe ei e w ds t a glanc ead them wrong f they ar printed wro hat n ht c ding to the way f printing In a f eign language, although it m y be printed with th same letters we ead by so m ch the mo sl wly as we d not unde rstand ar un bl promptly t percei the wo ds. B t we noti e misprints all b m e eadily F r this easo Latin and G eek and still bett r H brew wo ks re m e correctly printed because the proof are better corrected than in German w ks Of tw friends f mine, knew much Hebrew the other little the latter ho ga instruct in Heb ew in gymnas um and when he called the other h lp rr t his pupils exe cises t turned ut that h uld find out all sorts f ... err rs better than his friend, because the latter s perceptio f the w rds as totals was too wift.

[1] R manes. *M ntal E l in Animals* p 3 4

M Lazarus *Das Leb d S e* II (857) p. 3 In th dinary hearing f speech half th ds w seem to hear are poured out f ur wn head. A language with which we

fore Take a single pair of crossed lines (Fig 49) hold them in a horizontal plane before the eyes and look along them at such a distance that with the right eye shut 1 and with the left eye shut 2 looks like the projection of a vertical line Look steadily now at the point of intersection of the lines with both eyes open and you will see a third line sticking up like a pin through the paper at right angles to the plane of the two first lines The explanation of this illusion is very simple but so circum stantial that I must refer for it to Mrs Franklin s own account[1] Suffice it that images of the two lines fall on corresponding rows of retinal points and that the illusory vertical line is the only object capable of throwing such images A variation of the experiment is this



FIG 49

In Fig 50 the lines are all drawn so as to pass through a common point With a little trouble one eye can be put into the position of this point—it is only necessary that the paper be held so that with one eye shut the other eye sees all the lines leaning neither to the right nor to the left After a moment one can fancy the lines to be vertical staffs standing out of the plane of the paper This illusion [says Mrs Franklin] I take to be of purely mental origin When a line lies anywhere in a plane passing through the apparent vertical meridian of one eye and is looked at with that eye only we have no very good means of knowing how it is directed in that plane
plane
to thin
see a k

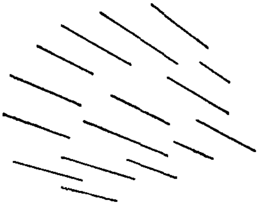


FIG 50

is a thing that has hardly ever happened to us except when they all have been vertical lines Hence when that happens we have a still stronger tendency to think that what we see before us is a group of vertical lines

In other words we see as always, the most probable object

The foregoing may serve as examples of the first type of illusions mentioned on page 508 I could cite of course many others but it would be tedious to enu merate all the thaumatropes and zoetropes dioramas and juggler s tricks in which they are embodied In the chapter on Sensation we saw that many il lusions commonly ranged under this type are physiologically considered of

[1] *American Jou al of Psychology* 1 p 101 ff

High authorities have doubted this power of imagination to falsify present impressions of sense. Yet it unquestionably exists. Within the past fortnight I have been annoyed by a smell, faint but unpleasant, in my library. My annoyance began by an escape of gas from the furnace below stairs. This seemed to get lodged in my imagination as a sort of standard of perception, for several days after the furnace had been rectified, I perceived the same smell again. It was traced this time to a new pair of India rubber shoes which had been brought in from the shop and laid on a table. It persisted in coming to me for several days however in spite of the fact that no other member of the family or visitor noticed anything unpleasant. My impression during part of this time was one of uncertainty whether the smell was imaginary or real and at last it faded out. Everyone must be able to give instances like this from the smell sense. When we have paid the faithless plumber for pretending to mend our

[illegible] we be[l]ieve the ventilator is shut we feel the room close. On discovering it open the oppression disappears. An extreme instance is given in the following extract

A patient called at my office one day in a state of great excitement from the effects of an offensive odor in the horse-car she had come in and which she declared had probably emanated from some very sick person who must have been just carried in it. There could be no doubt that something had affected her seriously, for she was very pale, with nausea, difficulty in breathing, and other evidences of bodily and mental distress. I succeeded, after some difficulty and time, in quieting her, and she left protesting that the smell was unlike anything she had ever before experienced and was something dreadful. Leaving my office soon after, it so happened that I found her at the street-corner waiting for a car; we thus entered the car together. She immediately called my attention to the same sickening odor which she had experienced in the other car, and began to be affected the same as before, when I pointed out to her that the smell was simply that which always emanates from the straw which has been in stables. She quickly recognized it as the same, when the unpleasant effects which arose while she was possessed with another perception of its character at once passed away.

It is the same with touch. Everyone must have felt the sensible quality change under his hand, as sudden contact with something moist or hairy in the dark awoke a shock of disgust [illegible] fer wh [illegible]

n
e
a
e

Chapter [on] the Perception of Space, p. 4[?]8. The question will soon come before us again in th[e] [illegible]

C. F. Taylor: Sensation and Pain, p. 37 (N. Y. 1882).

Testimony to personal identity is proverbially fallacious for similar reasons. A man has witnessed a rapid crime or accident and carries away his mental image Later he is confronted by a prisoner whom he forthwith perceives in the light of that image and recognizes or identifies as a participant although he may never have been near the spot Similarly at the so called materializing séances ' which fraudulent mediums give in a dark room a man sees a gauze-robed figure who in a whisper tells him she is the spirit of his sister mother wife or child and falls upon his neck The darkness the previous forms and the expectancy have so filled his mind with premonitory images that it is no wonder he perceives what is suggested These fraudulent séances would furnish most precious documents to the psychology of perception if they could only be satisfactorily inquired into In the hypnotic trance any suggested object is sensibly perceived *In certain subjects this happens more or less completely after waking from the trance* It would seem that under favorable conditions a somewhat similar susceptibility to suggestion may exist in certain persons who are not otherwise entranced at all

This suggestibility is greater in the lower senses than in the higher A German observer writes

We know that a weak smell or taste may be very diversely interpreted by us and that the same sensation will now be named as one thing and the next moment as another Suppose an agreeable smell of flowers in a room A visitor will notice it seek to recognize what it is and at last perceive more and more distinctly that it is the perfume of roses—until after all he discovers a bouquet of violets Then suddenly he recognizes the violet smell and wonders how he could possibly have hit upon the roses —Just so it is with taste Try some meat whose visible characteristics are disguised by the mode of cooking and you will perhaps begin by taking it for venison and end by being quite certain that it is venison until you are told that it is mutton whereupon you get distinctly the mutton flavor —In this wise one may make a person taste or smell what one will if one only makes sure that he shall conceive it beforehand as we wish by saying to him Doesn t that taste just like etc ? or Doesn t it smell just like etc ? One can cheat whole companies in this way announce for instance at a meal that the meat tastes high and almost everyone who is not animated by a spirit of opposition will discover a flavor of putrescence which in reality is not there at all

In the sense of feeling this phenomenon is less prominent because we get so close to the object that our sensation of it is never incomplete Still examples may be adduced from this sense On superficially feeling of a cloth one may confidently declare it for velvet whilst it is perhaps a long haired cloth or a person may perhaps not be able to decide whether he has put on woolen or cotton stockings and trying to ascertain this by the feeling on the skin of the feet he may become aware that he gets the feeling of cotton or wool according as he thinks of the one or the other When the feeling in our fingers is somewhat blunted by cold we notice many such phenomena being then more exposed to confound objects of touch with one another [1]

In our m us as

[1] G H. Meyer *Untersuchu gen* etc pp 242–43

Of accidental and occasional illusions of sight many amusing examples might be given. Two will suffice. One is a reminiscence of my own. I was lying in my berth in a steamer listening to the sailors holystone the deck outside; when on turning my eyes to the window I perceived with perfect distinctness that the chief-engineer of the vessel had entered my state-room, and was standing looking through the window at the men at work upon the guards. Surprised at his intrusion, and also at his intentness and immobility, I remained watching him and wondering how long he would stand thus. At last I spoke; but getting no reply, sat up in my berth, and then saw that what I had taken for the engineer was my own cap and coat hanging on a peg beside the window. The illusion was complete; the engineer was a peculiar looking man, and I saw him unmistakably; but after the illusion had vanished I found it hard voluntarily to make the cap and coat look like him at all.

The following story, which I owe to my friend Prof. Hyatt, is of a probably not uncommon class:

During the winter of 18[illegible] while in Venice, I had th[illegible] somewhat peculiar illusion which you request me to relate. I remember the circumstances [illegible]ery accurately because I ha[illegible]e often [illegible]epeated the story and ha[illegible]e made an eff[illegible]rt to keep all the attendant circumstances clear [illegible]f exaggeration. I was tra[illegible]elling with my mother and we had taken [illegible]ooms at a hotel which had been located in an old palace. The room in which I went t[illegible] bed was larg[illegible] and lofty. The moon was shining brightly and I remember standing before a draped wind[illegible]w thinking of the romantic nature of the surroundings, remnants of old st[illegible]ries of knights and ladies, and the possibility that even in that room [illegible]self love scenes and sanguinary tragedies might ha[illegible]e taken place. The night was so l[illegible]ely that man[illegible] of the people were strolling through the narrow lanes or so-called streets singing as they went, and I laid awake fo[illegible] some time listening to these patrols [illegible]f serenaders, and of course finally fell asleep. I became aware that som[illegible]on[illegible] was leaning over me closely and that my own b[illegible]eathing was being interfered with [illegible] a decided feeling of an unwelcome presence of some sort awakened me. As I [illegible]pened my eyes I saw as distinctly as I ever saw any living person, a draped head about a foot or eighteen inches to the right and just above my bed. The horror which took possession of my young fancy was bey[illegible]nd anything I ha[illegible]e ever experienced. The head was co[illegible]ered by a long black [illegible]eil which floated o[illegible]t int[illegible] the moon light, the f[illegible]ce [illegible]self was pale and beautiful, and the l[illegible]wer part [illegible]wathed in the white [illegible] by the [illegible] [illegible]f Catholic [illegible]rders. My hair [illegible]eemed to rise up and [illegible]

[illegible]

tinct until I reached [illegible]t sharply with my hand, and then disappeared, to [illegible]eturn again, however, as soon as I sank back into the pillow. The second or third grasp which I made at the head was [illegible]ot followed by [illegible] reappearance, and I then saw that th[illegible] ghost was [illegible]ot [illegible] real presence but depended upon the position [illegible]f my head. If I moved my eyes either to the l[illegible]ft or right [illegible]f the [illegible]riginal position occupied by my head when I [illegible]wakened, th[illegible] ghost disappeared, and by returning to about the sam[illegible] position, I c[illegible]uld make it reappear with nearly th[illegible] same intensity as at first. I p[illegible]esently satisfied m[illegible]self by these experime[illegible] that the illus[illegible]n arose from t[illegible] [illegible]ect of the imagination aided by the [illegible]ctual fi[illegible]ur[illegible] made by [illegible]usual section of the moonbeams shining through the lace curtains of the window. If I had given way to the first terror of the

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[illegible] p. 39 [illegible] his *Unt[illegible]suchungen [illegible] G[illegible] [illegible] de[illegible] Optik*, and Chapter XIII of [illegible] contributio[illegible] to Herma[illegible] *Handbuch der Physiologie*, vol. III.

clock strokes (above p 499) But even when stronger sensations of sound have been present everyone must recall some experience in which they have altered their acoustic character as soon as the intellect referred them to a different source The other day a friend was sitting in my room when the clock which has a rich low chime began to strike Hollo! said he hear that hand organ in the garden and was surprised at finding the real source of the sound I had myself some years ago a very striking illusion of the sort Sitting reading late one night I suddenly heard a most formidable noise proceeding from the upper part of the house which it seemed to fill It ceased and in a moment renewed itself I went into the hall to listen but it came no more Resuming my seat in the room however there it was again low mighty alarming like a rising flood or the *avant courier* of an awful gale It came from all space Quite startled I again went into the hall but it had already ceased once more On returning a second time to the room I discovered that it was nothing but the breathing of a little Scotch terrier which lay asleep on the floor The noteworthy thing is that as soon as I recognized what it was I was compelled to think it a different sound and could not then *hear* it as I had heard it a moment before

In the anecdotes given by Delbœuf and Reid this was probably also the case, though it is not so stated Reid says

I remember that once lying abed and having been put into a fright I heard my own heart beat but I took it to be one knocking at the door and arose and opened the door oftener than once before I discovered that the sound was in my own breast. (*Inquiry* chap iv § 1)

Delbœuf s story is as follows

The illustrious P J van Beneden senior was walking one evening with a friend along a woody hill near Chaudfontaine Don t you hear said the friend the noise of a hunt on the mountain? M van Beneden listens and distinguishes in fact the giving tongue of the dogs They listen some time expecting from one moment to another to see a deer bound by but the voice of the dogs seems neither to recede nor approach At last a countryman comes by and they ask him who it is that can be hunting at this late hour But he pointing to some puddles of water near their feet replies Yonder little animals are what you hear And there there were in fact a number of toads of the species *Bombinator igneus* This batrachian emits at the pairing season a silvery or rather crystalline note Sad and pure it is a voice in nowise resembling that of hounds giving chase [1]

The sense of sight as we have seen in studying Space is pregnant with illusions of both the types considered No sense gives such fluctuating impressions of the same object as sight does With no sense are we so apt to treat the sensations immediately given as mere signs with none is the invocation from memory of a *thing* and the consequent perception of the latter so immediate The thing which we perceive always resembles as we have seen the object of some absent sensation usually another optical figure which in our mind has come to be the standard of reality and it is this incessant reduction of our optical objects to more real forms which has led some authors into the mistake of thinking that the sensations which first apprehend them are originally and natively of no form at all [2]

[1] *Examen c it que de la loi psych phy que* (1883) p 61

[2] *Cf* A W Volkm s ssay Über Ursprurgliches und Erworbenes in den Raumans-

themsel
briefly —
felt In all such experiences the paths are w ue open ... — to those concerned with the suggested ideas A circular after image on the receding wall or ceilin is actually *seen* as an ellipse a square after image of a cross there is seen as slant legged etc., because only in the process correlated with the vision of the latter figures do the inward currents find a pause (see the next chapter)

We must remember this when in dealing with the eye, we come to point out the erroneousness of the principle laid down by Reid and Helmholtz that true sensations can never be changed by the suggestions of experience

— —
some reason does no
st ong one e cre ap —
seems habitually to be the case in anæsthesia of the moving parts Close the patient s eyes hold his anæsthetic arm still and tell him to raise his hand to his he will h astonished to find that the move-
m
il
tl

f
1

pho — —
pos t on of the other fingers makes this impossible and yet if we do not look o see the fin e we think we feel it move He quotes from Exner a similar experiment with the jaws *Put some hard rubber or other unindentable obstacle between your back teeth and bite hard you think you feel the jaw move and the front teeth approach each other though in the nature of things no movement can occur* The usual suggestion of the path traversed by the finger tip as the loc s of the movement feeling in the joint, which we discussed on page 478 is an other example of this semi hallucinatory power of the suggested thing. Amputated peop e as we ha e learned still feel their lost feet, etc. This is a necessary consequence of the law of specific energies for if the central region cor

I the *P c ding f th Americ Society for P ychical R ar h* pp 53–54. I have tried to count some of th variati ns in this consciousness. O t f 4 persons wh m I f und to feel their lost foot, some did so d *biously* Either they nly feel t occasi nall or ly when it pains th m, nly hen th try t m e it they nl feel t when they think good deal bout it and mak an ff rt to co jur t p. When they grow inat tn the feeling dies ba k jumps back, t th tump E ery degree f consci usness, f m complete and permanent hallucinatio d wn to something hardly distinguishabl f m ordinary fancy seems represented in the sense f th missing extremity which these patients sa they have Indeed I ha seld m seen m re plausible lot f evidence f the iew that imaginati and sensatio are but differences f vi idness in an identical process than these confessions, taking them altogether contain. Many patients say they can hardly tell whether they feel or fancy th limb. *Pf ger' A chiv* xxxvii, p. 1.

situation and covered up my head I should probably have believed in the reality of the apparition since I have not by the slightest word so far as I know exaggerated the vividness of my feelings

The Physiological Process in Perception

Enough has now been said to prove the general law of perception, which is this that *whilst part of what we perceive comes through our senses from the object before us another part* (and it may be the larger part) *always comes* (in Lazarus s phrase) *out of our own head*

At bottom this is only one case (and that the simplest case) of the general fact that our nerve centres are an organ for reacting on sense impressions and that our hemispheres in particular are given us in order that records of our private past experience may co operate in the reaction Of course such a general way of stating the fact is vague and all those who follow the current theory of ideas will be prompt to throw this vagueness at it as a reproach Their way of describing the process goes much more into detail The sensation they say awakens images of other sensations associated with it in the past These images fuse or are combined by the Ego with the present sensation into a new product the percept etc etc Something so indistinguishable from this in practical outcome is what really occurs that one may seem fastidious in objecting to such a statement specially if he have no rival theory of the elementary processes to propose And yet if this notion of images rising and flocking and fusing *be* mythological (and we have all along so considered it) why should we entertain it unless confessedly as a mere figure of speech? As such of course it is convenient and welcome to pass But if we try to put an exact meaning into it all we find is that the brain reacts by paths which previous experiences have worn and makes us usually perceive the probable thing i e the thing by which on previous occasions the reaction was most frequently aroused

But we can I think without danger of being too speculative be a little more exact than this and conceive of a physiological reason why the felt quality of an object changes when instead of being apprehended in a mere sensation the object is perceived as a thing All consciousness seems to depend on a certain slowness of the process in the cortical cells The rapider currents are the less feeling they seem to awaken If a region A then be so connected with another region B that every current which enters A immediately drains off into B we shall not be very strongly conscious of the sort of object that A can make us feel If B on the contrary has no such copious channel of discharge the excitement will linger there longer ere it diffuses itself elsewhere and our consciousness of the sort of object that B makes us feel will be strong Carrying this to an ideal maximum we may say that if A offer *no* resistance to the transmission forward of the current and if the current terminate in B then no matter what causes may initiate the current we shall get no consciousness of the object peculiar to A but on the contrary a vivid sensation of the object peculiar to B And this will be true though at other times the connection between A and B might lie less open and every current *then* entering A might give us a strong consciousness of A s peculiar object In other words just in proportion as associations are habitual will the qualities of the suggested thing tend to substitute

vement On the whole I am inclined to think Mr Lewes s term of assimilation the most fru tful one yet used

Professor H Steinthal has analyzed apperceptive processes with a sort of detail which is simply burdensome His introduction of the matter may how ever be quoted He begins with an anecdote from a comic paper

In the compartment of a railway-carriage six persons unknown to each other sit n li ely con ersation It becomes a matter of regret that o e of the company must l ght at the next station One of the othe s says that he of all things prefers such a meeting with entirely unknown persons and that on such occas ons he is accustomed either to ask who o what his companions may be nor to tell wh or what he is. An ther thereupon says that he w ll undertake to decide this question if they each and all will answer him an entirely disconnected question They began. He d ew five lea es from his note-book wr te a question on each and gav one to each of his

x u are a farmer All admitted that he was right whe eupon he got out and left the fi e behind. Each wished to kn w what que tion the others had received and beh ld he had gi en the same questi n to each It an thus

What being destroys what t has tself b ought forth?

T this the naturalist had answered "vital force the soldier 'war the philol ogist, Kron s the publicist, re lution th farmer a h Th

... ... nt and the answer is an opening through whi h e ees int ur interiors So do w all W ar all able to recognize the cle gyman, the s ldier the sch lar the b siness m n not only by the c t of their / say and h w they express they how and the way in ... ... peak, by the point of view from hich they regard things, judge them conceive them in short by their mode of pperce g

E ery man has one group of deas which relate to his own person and interests and another which s c nn ct d with so ety Each has his group f deas about plants eligio law art tc. and mor especially abo t the ose, ep c p try sermons f ee t ad and the lik Thus th mental co tent f every individual even of the unedu t d and of children o sists of mas es o ci cles of knowledge of which ea h lies thin some larger circle al ngside of others imilarly includ d and f which each cl des small r ci cles within it elf The per eptu n f a thing like a h s a process between the prese t horse s picture befo e our eyes on th o e hand, and th e fused or int rw en p ctures and deas of all the horses we h eve s en on th ther a process between two factors or *moment* of which one existed be f e the p ocess and was an old possession of the mind (the gr up f ideas or con

P blem vol. I, p. 8 ff

Se his *Einleit* g d *P ych l gie* *Spr hwis ens h ft* (88) p 66 ff

O f my colleagues asking himself th q esti ft ding th anecd t tells me th t h replied Harvard C lleg th f culty f that body having voted few d ys pre usly t keep back th degrees f members f th gr d ting class wh might be diso d ly class-day night.—W J

related with the foot give rise to any feeling at all it must give rise to the feeling of a foot [1] But the curious thing is that many of these patients can *will the foot to move* and when they have done so distinctly *feel the movement to occur* They can to use their own language work or wiggle' their lost toes [2]

Now in all these various cases we are dealing with data which in normal life are inseparably joined Of all possible experiences it is hard to imagine any pair more uniformly and incessantly coupled than the volition to move on the one hand and the feeling of the changed position of the parts on the other From the earliest ancestors of ours which had feet, down to the present day the *movement of the feet must always* have accompanied the will to move them and here if anywhere, habit s consequences ought to be found [3] The process of the willing ought then, to pour into the process of feeling the command effected and ought to awaken that feeling in a maximal degree provided no other positively contradictory sensation come in at the same time In most of us when the *will fails of its effect there is a contradictory sensation We discern a resistance* or the unchanged position of the limb But neither in anæsthesia nor in amputation can there be any contradictory sensation in the foot to correct us so imagination has all the force of fact

'Apperception"

In Germany since Herbart s time Psychology has always had a great deal to say about a process called *Apperception* [3] The incoming ideas or sensations are said to be apperceived by masses of ideas already in the mind It is plain *that the process we have been describing as perception is* at this rate an apperceptive process So are all recognition classing and naming and passing beyond these
apperceptive
cause it has
' psychic rea
tion or simply thought are perfect synonyms for its Herbartian meaning widely taken It is moreover hardly worth while to pretend to analyze the so-called apperceptive performances beyond the first or perceptive stage because their variations and degrees are literally innumerable Apperception is a name for the sum total of the effects of what we have studied as association and it is obvious that the things which a given experience will suggest to a man depend on what Mr Lewes calls his entire psychostatical conditions his nature and *stock of ideas or in other words his character habits memory* education previous experience and momentary mood We gain no insight into what really occurs either in the mind or in the brain by calling all these things the apperceiving mass ' though of course this may upon occasion be con

[1] Not all pati nts have this add tional llusion
[2] I ought to say that in *alm st* all ca es the I t n is followed by actual contraction of muscles in the *stump* [3] *Cf* Herbart *Psychol als Wissenschaft* § 125
[4] *Cf* the historical revi vs by K L ng *Üb r App c pt o* (Plauen 1879) pp 12 14 by Staude in Wundt s *Philosophische Stud e* I p 149 and by Marty in *Vtert ljsch f wiss Phil* x p 347 ff

venient. On the whole I am inclined to think Mr Lewes s term of assimilation the most fruitful one yet used

Professor H. Steinthal has analyzed apperceptive processes with a sort of detail which is simply burdensome. His introduction of the matter may how ever be quoted. He begins with an anecdote from a comic paper

In the compartment of a railway-carriage six persons unknown to each other sat in h ely con ersation It becomes matter of regret that one of the company must aught t the ext station. One of the thers savs that he of all things prefers such a meeting with entirely unknown persons and that on uch occasions he is accustomed neither to ask who or what his companions may be nor to tell who or what he is. Another thereupon says that he will undertake to decide this question, if they each and all will answer him an entirely disco..nected question They began. He drew fi e lea es from his note-book, wro.e a ques on on each, and gave one to each of his companions with the request that he write the answer below When the lea es were turned t him, he turned, after reading them without hesitation to the others and said t the first. "Y u are a man of science to the second, "Y u are a soldier to th third, "You are a philologer" to th fourth, "You are a journalist to the fifth, You are a farmer All admitted that he was right whereupon he got out and left the fi e behind. Each wished to kn w what question the others had received and behold h had gi en the same question to each. It ran thus

h elf bro ght forth?

E ery question is a b le-drillin experiment and the answer is an openin, throu.h which one sees into ur interiors. So do w all. We are all b.e to reco-.e the cler-man, the soldier the scholar the business man not only by the cut of their garments and the attitude of their body but by w.at they say and how they express t We guess the pla e in life of men by the interest which they show and the way in whi h they show it, by the objects of which they speak, by the point of view from which they regard things, ju..e them, concei e them, in short by their mode of *per ei ing*

E ery man has one group of ideas which elate to his own person and interests, and another which is connected with soci ty Each has his gr up of ideas about plants, ..ation, law art etc., and m e especially about the rose, epic poetry serm ns free trade and the like Thus the mental co.tent of every indi dual ev en of the unedu-ted a.d f children consists of ma.ses o circles of kn wledge f which each lies hin some larger circle, alo..side of others similarly included, and of which each in l des smaller circles within tself The pe ception f a thi..g like a horse process between th present horse p.cture before ur eyes on th one hand, and those fused or interwo en pictures and deas of all th h rses w ha e ever seen, on th o.ber process between two factors or *momen.a*, of which one existed be-f re the process and was an o.d possession of the mind (the group of deas, or con

P oblem vol. I, p. 8 ff

See his *Einleitung in die P ychologie u. Sprachwissenschaft* (8S) p 66 ff

One f m colleag es, a.king himself th questi after readin.. t.. anecd te, tells me t.. be repued Harvard College, the faculty f that body having voted, few days pre vious t keep back the degrees f members f th graduating class who might be diso derly on class-day n.g.t.—W J

related with the foot give rise to any feeling at all it must give rise to the feeling of a foot[1] But the curious thing is that *many of these patients can will the foot to move* and when they have done so distinctly *feel the movement to occur* They can to use their own language, work or wiggle' their lost toes[2]

Now in all these various cases we are dealing with data which in normal life are inseparably joined Of all possible experiences it is hard to imagine any pair more uniformly and incessantly coupled than the volition to move on the one hand and the feeling of the *changed position of the parts* on the other From the earliest ancestors of ours which had feet down to the present day the movement of the feet must always have accompanied the will to move them and here *if anywhere* habit s consequences ought to be found[3] The process of the willing ought then to pour into the process of feeling the command effected, and ought to awaken that feeling in a maximal degree provided no other positively contradictory sensation come in at the same time In most of us when the will fails of its effect there is a *contradictory sensation* We discern a resistance or the unchanged position of the limb But neither in anæsthesia nor in amputation can there be any contradictory sensation in the foot to correct us, so imagination has all the force of fact

'Apperception"

*that the process we have been describing as perception is at this rate an app*ceptive process So are all recognition classing and naming and passing beyond these simplest suggestions all farther thoughts about our percepts are apperceptive processes as well I have myself not used the word apperception because it has carried very different meanings in the history of philosophy[4] and 'psychic reaction interpretation conception assimilation elaboration or simply thought are perfect synonyms for its Herbartian meaning widely taken It is moreover hardly worth while to pretend to analyze the so-called apperceptive performances beyond the first or perceptive stage because their variations and degrees are literally innumerable Apperception is a name for the sum total of the effects of what we have studied as association and it is obvious that the things which a given experience will suggest to a man depend on what Mr Lewes calls his entire psychostatical conditions his nature and stock of ideas *or in other words his character habits memory* education previous experience and momentary mood We gain no insight into what really occurs either in the mind or in the brain by calling all these things the apperceiving mass, *though of course this may upon occasion be con*

[1] Not all patients have this additional illusion

[2] I ought to say that *in almost* all cases the vol t o is followed by actual contraction of muscles in the *stump*

[3] *Cf* Herbart *Psychol als Wissenschaft* § 125

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tl

b

h h e sees into r m

cl gyman, the soldie the cholar the bu e s man not o ly by the c t of their garments and the attitude of thei body but by what they say and how they express it We guess the place in life of men by the interest which they how and the way in hi h they show t by the object f which they speak by the po nt of view from hich they gard things judge them co ceive them in short by their mode of *pperce g*.

E ery man has one group f deas wh ch relate t hi own person and inte ests and anoth r which connected w th society Each has his g oup f deas about plants el gion law art etc and more especially about the se epic po try ermons free trade and the like Thus the mental co t t f every indi idual e en of the unedu ted and of children consi ts f masses or circles of knowledge of whi h each l es thin som larger circle alongs de of oth rs imil ly includ d and of whi h each cl des smalle ci cles within tself The p cept on f a th g like a horse p oces betw e the p esent horse s p cture b fo e ur eyes on the one hand and th se *fused or interw e p tures* d deas of all the ho ses we ha e ever seen n th ther a p ocess between two factors or *moment* of which o e exist d be fo e the p ocess and was an old possession of the mind (the gr up of ideas or con

P blem L I, p. 8 ff

See his *Einleit g in die P ych l gie Spr hwis ens haft* (88) p 66 ff

On f my ll gues ki g himself th q esti ft read g th anecd t tell m h t h replied Harva d C llege, th faculty f th t b dy ha ing t d f w days pre usly t k p back th degrees f members f th gr d ting class wh might be diso d ly class-day night.—W J

cept namely) whilst *the other is but just presented to the mind* and is the immediately supervening factor (the sense impression) The former apperceives the latter the latter is apperceived by the former Out of their combination an apperception product arises the knowledge of the perceived being as a horse The earlier factor is relatively to the later one active and *a priori* the supervening factor is given *a posteriori* passive We may then define *Apperception as the movement of two masses of consciousness (Vorstellungsmassen)* against each other so as to produce a cognition

The *a priori* factor we called active the *a posteriori* factor passive but this is only relatively true Although the *a priori* moment commonly shows itself to be the more powerful apperception processes can perfectly well occur in which the new observation transforms or enriches the apperceiving group of ideas A child who hitherto has seen none but four cornered tables apperceives a round one as a table but by this the apperceivin mass (table) is enriched To his previous knowledge of tables comes this new feature that they need not be four cornered but may be round In the history of science it has happened often enough that some discovery at the same time that it was apperceived i e brought into connection with the system of our knowledge transformed the whole system In principle however we must *maintain that although either factor is both active and passive the a priori factor* is almost always the more active of the two [1]

This account of Steinthal s brings out very clearly the *difference between our psychological conceptions and what are called concepts in logic* In logic a concept *is unalterable but what are popularly called our* conceptions of things alter by being used The aim of Science is to attain conceptions so adequate and exact that we shall never need to change them There is an everlasting struggle in every mind between the tendency to keep unchanged and the tendency to renovate its ideas Our education is a ceaseless compromise between the conservative and the progressive factors Every new experience must be disposed of under *some* old head The great point is to find the head which has to be least altered to take it in Certain Polynesian natives seeing horses for the first time called them pigs that being the nearest head My child of two played for a week with the first orange that was given him calling it a ball He called the first whole eggs he saw potatoes having been accustomed to see his eggs broken into a glass and his potatoes without the skin A folding pocket corkscrew he unhesitatingly called bad scissors Hardly any one of us can make new heads easily when fresh experiences come Most of us grow more and more enslaved to the stock conceptions with which we have once become familiar and less and less capable of assimilating impressions in any but the old ways Old fogyism in short is the inevitable terminus to which life sweeps us on Objects which violate our established habits of apperception are simply not taken account of at all or if on some occasion we are forced by dint of argument to admit their existence twenty four hours later the admission is as if it were not and every trace of the unassimilable truth has vanished from our thought Genius in truth means little more than the faculty of perceiving in an unhabitual way

On the other hand nothing is more congenial from babyhood to the end of life than to be able to assimilate the new to the old to meet each threatening violator or burster of our well known series of concepts as it comes in see

[1] *Op cit* pp 166–71

through its unwontedness and ticket it off as an old friend in disguise This victorious assimilation of the new is in fact the type of all intellectual pleasure. The lust for it is curiosity The relation of the new to the old before the assimilation is performed is wonder We feel neither curiosity nor wonder concerning things so far beyond us that we have no concepts to refer them to or standards by which to measure them The Fuegians in Darwin s voyage wondered at the small boats, but took the big ship as a matter of course Only what we partly know already inspires us with a desire to know more The more elaborate textile fabrics the vaster works in metal to most of us are like the air the water and the ground absolute existences which awaken no ideas It is a matter of course that an engraving or a copper plate inscription should possess that degree of beauty But if we are shown a *pen-drawing* of equal perfection our personal sympathy with the difficulty of the task makes us immediately wonder at the skill The old lady admiring the Academician s picture says to him And is it really all done *by hand!*

Is Perception Unconscious Inference?

A widely spread opinion (which has been held by such men as Schopenhauer Spencer Hartmann Wundt Helmholtz, and lately interestingly pleaded for by M Binet) will have it that *percept on should be called a sort of reasoning operation more or less unconsciously and automatically performed.* The question seems at first a verbal one depending on how broadly the term reasoning is to be taken If every time a present sign suggests an absent reality to our mind we make an inference and if every time we make an inference we reason then perception is indubitably reasoning Only one sees no room in it for any un[illegible] Both associates the present sign and the contiguous things

ate inference and that the middle term is unconscious When the sensation which I have called this (p 506 *supra*) is felt they think that some process like the following runs through the mind

Th great maxim in pedagogy is to knit every new piece [illegible] knowledge [illegible] pre-existing curiosity—i.e., t assimilate its matter in some way t what is already known. H[illegible]ce the advantage of comparing all that is far [illegible] and foreign to something that is near h[illegible]me [illegible] making the unknown plain by th example [illegible] th known, and [illegible] connecting all th instruction with the personal experience [illegible] the pupil. If th teacher is t explain th distance [illegible] the sun from the earth let him ask 'If any one there in the sun fired [illegible] a cannon straight t[illegible] you, what sh[illegible]ld y[illegible] d[illegible]?' 'Get [illegible] [illegible] th way w[illegible]uld be the answer [illegible] need [illegible] that, th teacher might reply 'Y[illegible] may quietly go t[illegible] sleep in y[illegible]ur room, and get up again, [illegible] ma[illegible] wait till y[illegible]ur confirmation-day [illegible] may learn [illegible] trade, and grow [illegible] [illegible]ld as I am—*then* [illegible]nly will the cannon-ball be getting near *them* yo[illegible] may jump t[illegible] one side See, so great as t[illegible] is the [illegible] distance!' (K. Lang[illegible] *Über Apperception* [879] p. [illegible]6—a charming though prolix little w[illegible]rk.)

[illegible] Sch[illegible]penhauer *Sa[illegible]* [illegible] *Grund* chap iv H[illegible] [illegible] pe[illegible]ce[illegible] *Psy[illegible]hol[illegible]gy* part vi, chaps. ix. x. E [illegible] Hartmann, *Phil [illegible] [illegible] the Unconscious (B)* chaps. vii, viii. W Wundt *Be[illegible]* [illegible] p [illegible] ff [illegible] *Vorle[illegible]* [illegible] iv xiii. H. Helmholtz *Physiol Optik* pp. 4[illegible]0, 447 A. Binet, *Psychol. d[illegible] [illegible]aisonnement* chaps. iii, [illegible] Wundt and Helmh[illegible]ltz have more recently [illegible]re[illegible]canted. See above p. [illegible] note.

This is M
but M is A
therefore h

the … is itself an act of perception and sho … perception were inference require a still earlier syllogism for its performance and so backwards *in infinitum* The only extrication from this coil would be to represent the process in altered guise thus

This is *like those*
Those are A
Therefore this is A

The major premise here involves no association by contiguity, no *naming* of *those* as M but only a suggestion of unnamed similar images a recall of analogous past sensations with which the characters that make up A were habitually conjoined But here again what grounds of fact are there for admitting this recall? We are quite unconscious of any such images of the past And the conception of all the forms of association as resultants of the elementary fact of habit worn paths in th … ely superfluous for … of this the sign … used in company with the … s of the full object A direct paths of … t be already es … as from this … to A (paths which wo … carry the same conclusion … h

… paths are doubtless traversed in … they are in all probability closed So far then from perception being a species of reasoning properly so called both it and reasoning are coordinate varieties of that deeper sort of process known psychologically as the association of ideas and physiologically as the law of habit in the brain *To call perception unconscious reasoning is thus either a useless metaphor or a positively misleading confusion between two different things*

One more point and

… mple and universal is this Knowledge and Feeling —Perception and Sensation though always coexistent are always in the inverse ratio of each other Hamilton wrote as if perception and sensation were two coexistent elements entering into a single state of consciousness Spencer refines upon h … ing that they are two mutually ex … nents of a single state If sensation … ainly take it in this discussion to … the feeling of *pleasure* or *pain* there is no doubt that the law however expressed is true and that the mind which is strongly conscious of the pleasant

[1] When not all M but only some M is A when in other words, M is undistributed the conclusion is liable to error Illus … as would thus be *logical fallacies* if true perceptions were valid syllogisms. They would d a v false conclusions from undist buted middle terms.

ness or painfulness of an experience is ipso facto less fitted to observe and analyze its outward cause Apart from pleasure and pain however the law seems but a corollary of the fact that the more concentrated a state of consciousness is the more vivid it is When feeling a color or listening to a tone *per se* we get it more intensely notice it better than when we are aware of it merely as one among many other properties of a total object. The more diffused cerebral excitement of the perceptive state is probably incompatible with quite as strong an excitement of separate parts as the sensational state comports So we come back here to our own earlier discrimination between the perceptive and the sensational processes and to the examples which we gave on pp 504–05

Hallucinations

Between normal perception and illusion we have seen that there is no break the *process* being identically the same in both The last illusions we considered might fairly be called hallucinations We must now consider the false perceptions more commonly called by that name In ordinary parlance hallucination

See Spencer *Psychology* ii, p 50, n te, f a physi l gical hypothesis to account f r this f

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choly femal patie ts wh were afflicted in this w y Th *re delus ns f*

general persecuti
ge ral uspici
being poiso ed
being killed
being nspired against
being d ded
bei g preached against in church
bein, pregnant
being desti t
being f ll ed by th police
being ry wicked
impendi g de th
impending calamity
the soul being l st
ha ing t much
h ing insid
ha in, bo in th thro t
ha ing l st much m ney
being unfit t li
that sh will t reco
th t sh is t b murd ed
th t sh is t be b il d ali e
that sh is t be starved
th t th flesh is boiling
that th head is se red from th body
that childre are burning
that murders tak pla around
that it is wr g t take food
being in hell
bein, tempted f th devil

is held to differ from illusion in that whilst there is an object really there in illusion *in hallucination there is no objective stimulus at all* We shall presently see that this supposed absence of objective stimulus in hallucination is a mis take and that hallucinations are often onl ption process in which the second portion to the appear t they I ist be guarded against vards by mistake But plete it is much more than a mental image *A ation is a strictly sensational form of consciousness as good and true a sensation as if there were a real object there* The object hap pens not to be there that is all

The milder degrees of hallucination have been designated as *pseudo hal lucinations* Pseudo hallucinations and hallucinations have been sharply dis tinguished from each other only within a few years Dr Kandinsky writes of their difference as follows

> In carelessly questioning a patient we may confound his pseudo hallucinatory per ceptions with hallucinations But to the unconfused consciousn at himself even though he be imbecile the id n possible at least in th t
>
> f himself whilst subject to a t ter is reality itself the former on the contrary r a ways a subjective phenomenon which the individual commonly regards either as sent to him as a sign of God s grace or as artificially induced by his secret persecutors If he knows by his *own experience* what a genuine hallucination is it is quite impossible for him to mistake the pseudo hallucination for it A con crete example will make the difference clear
>
> Dr N L heard one day suddenly amongst the voices of his persecutors (com ing from a hollow space in the midst of the wall) a rather loud voice impressively saying to him Change your national allegiance Understanding this to mean that his only hope consisted *in ceasing to be subject to the Czar of Russia* he reflected a moment what allegiance would be better and resolved to become an F sub ject At the same moment he saw a pseudo hall hich appeared and quickly l ling ch) se a lion—now you will rule.

u ing possessed of the dev l	be ng chlo of rmed
having comm tt d an unpardonable sin	ha ng comm tt d mu der
unseen agencies working	fear of be ng hanged
her own identity	being ll d n mes by persons
be ng on fi e	be g cted on by sp rits
having ne the stomach nor brains	*b ing a m n*
being covered w th v rm n	the body be ng t ansformed
letters being writt n about her	insect com ng f om the body,
property being stolen	rap be ng p act sed on her
her ch ld n b ing kill d	ha g a v n real dise se
having committed theft	being a fish
the legs being made f glass	be g de d
having horns on the head	having committed su cide of the soul

whereupon the patient recollected that th lion was the national emblem of England. The lion appeared to L ery distinct and n d, but he nevertheless remained con scious as he ft rwards exp essed t that he saw the animal not with his bodily but with his mental eyes (After his eco ery he called analog us apparitions by the name of expres e plastic deas.) Acc rdingly h felt no terror even though he felt the contact of the claws. Had the lion been a complete hallucinatio the patient as he himself remarked after recovery w uld ha e felt great fear and very likely screamed or taken to flight. Had it been a simpl ima e of the fancy he would not ha e connected t with the v ices of whose objective reality he was at the time quite con inced.

From ordinary images of memory and fancy pseudo-hallucinations differ in bein much more vi id minute detailed steady abrupt and spontaneous in the sense that all feelin of our own activity in producing them is lacking Dr Kandinsky had a patient who after taking opium or hashish had abundant pseudo-hallucinations and hallucinations. As he also had trong visualizing power and was an educated physician the three sorts of phenomena could be (d ith h h pro ected outwards (usually not farther than the

Most of the oices which people hear (whether they give rise to delusions or not) are pseudo-hallucinations They are described as "*inner*" vo ces al though their character is entirely unlike the inner speech of the subject with himself I know two persons who hear such inner voices making unforeseen remarks whenever they grow quiet and listen for them. They are a very common incident of delusional insanity and at last grow into vi id hallucinations. The latter are comparatively frequent occurrences in sporadic form and certain individuals are liable to have them often From the results of the Census of Hallucinations, which was begun b Edmund Gurney it would appear that, roughly speaking one person at least in every ten is likely to have had a vivid hallucination at some time in his life The following cases from healthy people will give an idea of what these hallucinations are

When girl of eighteen, I was one evening engaged in ery painful discussion with an eld rly person. My distress was so great that I took up a thick i ory knittin needle that was lyin the mantelp f the parlo and broke t int mall p es as I talked. In the midst f the discussion I was ery wishful to know th pinion of a b ther with whom I had an unusually close relationship I turned r und and saw him sitting t t further side of a entre-table, with his arms f lded (an unusual position with him) but, t my dismay I percei ed from th sarcastic exp essi n of his m uth that he was not in sympath with me, was not taking my side, as I should then ha e exp essed t. The urprise cooled me, and th discussi n was dropped.

Som minu es after ha ing occa on to speak to my broth I turned towa ds him but he was g I inquired hen h l ft th room, and was t ld that he had not been in t, which I did t believe, thinking that he had come in fo a minute

¹ Kandinsky *Kritische u. Klinische B t achtungen im G biet d Sin t usch gen* (1885) p. 4

² See *Proc eding f th Society for Psy h Research* Dec., 1889, pp 183 The International Co gress for Experimental Psych l gy w has charg of th Census, and the present writer is its agent f America.

and had gone out without being noticed About an hour and a half afterwards he appeared and convinced me with some trouble that he had never been near the house that evening He is still alive and well

Here is another case

One night in March 1873 or 74 I cannot recollect which year I was attending on the sick bed of my mother About eight o clock in the evening I went into the dining room to fix a cup of tea and on turning from the sideboard to the table on the other side of the table before the fire which was burning brightly as was also the gas *I saw standing with his hand clasped to his side in tru m)*
of about thirty years of age
wore a small cap with

u that it was nothing of earth for he
i u i moved his eyes nor his body and in looking closely I could see the fire beyond I was of course startled and yet did not run out of the room I felt stunned. I walked out rapidly however *and turning to the servant in the hall asked her if* she saw anything She said not I went into my mother s room and remained talking for about an hour but never mentioned the above subject for fear of exciting her and finally forgot it altogether returning to the dining room still in forgetfulness of what had occurred but repeating as above the turning from sideboard to table *in* act of preparing more tea I looked casually towards the fire and there I saw the soldier again This time I was entirely alarmed and fled from the room in haste I called to *my father* but when he came he saw nothing

Sometimes more than one sense is affected The following is a case

In response to your request to *write* out *my experience of Oct 30* 1886 I will inflict on you a letter

On the day above mentioned Oct 30 1886 I was in ——— where I was teaching I had performed my regular routine work for the day and was sitting in my room working out trigonometrical formulæ I was expecting every day to hear of the confinement of my wife and naturally my thoughts for some time had been more or less with her She was by the way in B—— some fifty miles from me

At the time however neither she nor the expected event was in my mind as I said I was working out trigonometrical formulæ and I had been working on trigo*nometry the entire evening* About eleven o clock as I sat there buried in sines cosines tangents cotangents secants and cosecants I *felt* very *distinctly* upon my left shoulder a touch and a slight shake as if *somebody* had tried to attract my attention by other means and had failed Without rising I turned my head and there between me and the door stood my wife dressed exactly as I last saw her some five weeks before As I turned she said It is a little Herman he has come Something more was said but this is the only sentence I can recall To make sure that I was not asleep and dreaming I rose from the ch elf and walked toward the figure ve no informa*tion as to the lengt* was awake in my usual good heal olutely perfect stood about three f from the door which was closed and had not been opened during the evening The sound of the voice was unmistakable and I should have recognized it as my wife s voice even if *I had not turned* and *had not seen the figure* at all The tone was conversational just as if she would have said the same words had she been actually standing there

In regard to myself I would say as I have already intimated I was in my usual

good health. I had not been sick before, nor was I after the occurrence, not so much as a headache having afflicted me.

Shortly after the experience above described, I retired for the night and, as I usually do, slept quietly until morning. I did not speculate particularly about the strange appearance of the night before, and though I thought of it some, I did not tell anybody. The following morning I rose, not conscious of having dreamed anything, but I was very firmly impressed with the idea that there was something for me at the telegraph-office. I tried to throw off the impression, for so far as I knew there was no reason for it. Having nothing to do, I went out for a walk, and to help throw off the impression above noted, I walked away from the telegraph-office. As I proceeded, however, the impression became a conviction, and I actually turned about and went to the very place I had resolved not to visit, the telegraph-office. The first person I saw on arriving at said office was the telegraph-operator, who, being on terms of intimacy with me, remarked: 'Hello, Papa! I've got a telegram for you.' The telegram announced the birth of a boy weighing nine pounds, and that all were doing well. Now then, I have no theory at all about the events narrated above. I never had any such experience before or since. I am no believer in spiritualism, am not in the least superstitious, know very little about 'thought transference,' 'unconscious cerebration,' etc., etc., but I am absolutely certain about what I have tried to relate. In regard to the remark which I heard, 'It is a little Herman,' etc., I would add that we had previously decided to call the child, if a boy, *Herman*—my own name, by the way.*

The hallucination sometimes carries a change of the general consciousness with it, so as to appear more like a sudden lapse into a dream. The following case was given me by a man of 43 who had never anything resembling it before:

While sitting at my desk this A. M. reading a circular of the Loyal Legion a very curious thing happened to me, such as I have never experienced. It was perfectly real, so real that it took some minutes to recover from. It seems to me like a direct intromission into some other world. I never had anything approaching it before save when dreaming at night. I was wide awake, of course. But this was the feeling I

[illegible]

tirely new. I never had before such a sense of infinity in nature, such superb stretches of light and color and *clearness*. I know that for the space of three minutes I was entirely lost, for when I began to come to, so to speak,—sitting in that other world, I debated for three or four minutes myself as to which was dream and which was reality. Getting there I got a faint sense of C—— [the town in which the writer was] [illegible] and dim at first. Then I remember thinking 'Why, I used to live in C——; perhaps I am going back.' Slowly C—— did come back, and I found myself at my desk again. For a few minutes the process of determining where I was was very funny. But the whole experience was perfectly delightful: there was such a sense of brilliancy and clearness and lightness about it. I suppose it lasted in all about seven minutes or ten minutes.

The hallucinations of fever-delirium are a mixture of pseudo-hallucination, true hallucination, and illusion. Those of opium, hashish, and belladonna resemble them in this respect. The following vivid account of a fit of hashish delirium has been given me by a friend:

* This case is of the class which Mr. Myers terms 'veridical.' In a subsequent letter the writer informs me that his vision occurred some fifteen hours *before* the child was born.

I was reading a newspaper and the indication of the approaching delirium was an inability to keep my mind fixed on the narrative Directly I lay down upon a sofa there appeared before my eyes several rows of human hands which oscillated for a moment revolved and then changed to spoons The same *motions were repeated* the objects changing to wheels tin soldiers lamp posts brooms and countless other absurdities This stage *lasted about ten minutes* and during that time it is safe to say that I saw at least a thousand different objects These whirling images did not appear like the realities of life but had the character of the secondary images seen in the eye after looking at some brightly ill m A mere suggestion from the person who was h call up an image of the thing the common objects of life and en it is absolutely impossible to describe and which be creations of the brain

The character of the symptoms changed rapidly A sort of wave seemed to pass over me *and I became aware of the fact that my pulse was beating rapidly* I took out my watch and by exercising considerable will power managed to time the heart *beats 135 to the minute*

I could feel each pulsation through my whole system and a curious twitching commenced which no effort of the mind could stop

There were moments of apparent lucidity when I see within myself and watch the pump me a certainty that as quickly followed by ment a certainty that the experience was the xciting that I had ever been through

My mind was in an exceedingly impressionable state Any place thought of or *suggested appeared with all the distinctness of the reality I thought of the Giant s* Causeway in Staffa and instantly I stood within the portals of Fingal s Cave. Great *basaltic columns rose on all sides* while huge waves *rolled through the chasm and* broke in silence upon the rocky shore Suddenly there was a roar and blast of sound and the word Ishmaral was echoing up the cave At the enunciation of this remarkable word the great columns of basalt changed into whirling clothes pins and I lau hed aloud at the absurdity

(I may here state that the word Ishmaral seemed to haunt my other hallucinations for I remember that I heard it frequently thereafter) I next enjoyed a sort of metempsychosis Any animal or thing that I thought of could be made the being which held my mind I thought of a fox and instantly I was transformed into that animal I could *distinctly* feel myself a fox could see my long ears and bushy tail and by a sort of introvision felt that my complete anatomy was that of a fox Sud*denly the point of vision changed My eyes seemed to be located* at the back of my mouth I looked out between the parted lips saw the two rows of pointed teeth and *closing my mouth with a snap saw—nothing*

I was next transformed into a bombshell felt my size weight and thickness and experienced the sensation of being *shot un o* *rtar looking down upon* the earth bursting d gments *them so absurd that I am* un m For example I was a little china doll deep do e of olive oil next moment a stick of twisted candy then a *skeleton* inclosed in a whirling coffin and so on *ad infinitum*

Towards the end of the delirium the whirling images appeared again and I was haunted by a singular creation of the brain which reappeared every few moments It was an image of a double faced doll with a cylindrical body running down to a point like a peg top

It was always the same having a sort of crown on its head and painted in two

colo s green and b own n a background f blue. The exp essi n of the Janus l Le profiles was always th same as w re th ad mments of the bod) After reco ering fr m the tt cts f th dru, I could not p tur to myself exactly h w this singular m nst osity app I was always isited by this phant m, and al ome lo f r b t wh ch appea ed pe

Th effe ts of the dru lasted bout an h ur and a half lea ing me and dizzy but fter a ten hour sleep I was myself again sa e for a slight in bility t keep my mind fixed on any p ece f w k fo any length of time which emained with me during m st of the next day

The Neural Process in Hallucination

Examples of these singular perversions of perception might be multiplied ndefinitely but I ha e no r m re Let u turn to the question of what the physiolo cal process may s t of an excitement from pe ception identical in kin a e usually needed to induce sense-organs arouse would seem under normal circumstances to be arousable in no other way On p 499 ff above we saw that the centres aroused by incom in peripheral currents are probably *identical with the centres used in mere* imagination and that the vi dness of the sensational kind of consciousness is pr bably correlated with a discrete degree of *intensity* in the process therein aroused Referrin the reader back to that passa e and to what was more lat l said on p 520 ff I now proceed to complete my theory of the perceptive process by an analysis of what may most probably be believed to take place in hall cination strictly so called

We have seen (p 501) that the free discharge of cells into each other through associati e paths is a likely reason why the maximum intensity of function is not reached when the cells are excited by their neighbors in the cortex At the end of Chapter XXV we shall return to this conception and whilst making it t ll more precise use it for explainin certain phenomena connected with the will The dea is that the leakage forward along these paths is too rapid for the ne t nsi n in any centre to accumulate to the maximal explosion point un l ss the e citing currents are greater than those which the various portions of th cortex supply to each other Currents from the periphery are (as t seems)

were to stop the tens on inside certain cells might reach the explosion point e en though the nfluence which excited them came only from nei hborin cor

sta d for the currents which are its natural stimulus then the hole in its bott m w ll of course represent the paths by which t transmits its excitement to othe associated cells Now let two other vessels have the function of supplying

it with water. One of these vessels stands for the neighboring cortical cells, and can pour in hardly any more water than goes out by the leak. The pail consequently never upsets in consequence of the supply from this source. A current of water passes through it and does work elsewhere, but in the pail itself nothing but what stands for *ideational* activity is aroused. The other vessel, however, stands for the peripheral sense-organs, and supplies a stream of water so copious that the pail promptly fills up in spite of the leak and presently *upsets*: in other words, *sensational* activity is aroused. But *it is obvious that if the leak were plugged* the slower stream of supply would also end by upsetting the pail.

To apply this to the brain and to thought: if we take a series of processes A B C D E associated together in that order, and suppose that the current through them is very fluent, there will be little intensity anywhere until perhaps a pause occurs at E. But the moment the current is blocked anywhere, say between C *and* D, *the process in* C *must grow more intense*, and might even be conceived to explode so as to produce a *sensation in the mind instead of an idea*.

It would seem that some hallucinations are best to be explained in this way. We have in fact a regular series of facts which can all be formulated under the single law that *the substantive strength of a state of consciousness bears an inverse proportion to its suggestiveness.* It is the halting-places of our thought which are occupied with distinct imagery. Most of the words we utter have no *time to awaken images at all*; *they simply awaken the following words*. But when the *sentence stops* an image dwells for awhile before the mental eye (see p. 158). Again, whenever the associative processes are reduced and impeded by the approach of unconsciousness, as in falling asleep, or growing faint, or becoming narcotized, we find a concomitant increase in the intensity of whatever partial consciousness may survive. In some people what M. Maury has called 'hypnagogic' hallucinations[1] are the regular concomitant of the process of *falling asleep. Trains of faces, landscapes, etc., pass before the mental eye, first as* fancies, then as pseudo-hallucinations, finally as full-fledged hallucinations forming dreams. If we regard association-paths as paths of drainage, then the shutting off of one after another of them as the encroaching cerebral paralysis advances ought to act like the plugging of the hole in the bottom of the pail, and make the activity more intense in those systems of cells that retain any activity at all. The level rises because the currents are not drained away, *until at last the full sensational explosion may occur.*

The usual explanation of hypnagogic hallucinations is that they are ideas deprived of their ordinary *reductives*. In somnolescence, sensations being extinct, the mind, it is said, then having no stronger things to compare its ideas with, ascribes to these the fulness of reality. At ordinary times *the objects of* our imagination are reduced to the *status of subjective facts by the ever-present contrast of our sensations with them.* Eliminate the sensations, however, this view supposes, and the 'images' are forthwith 'projected' into the outer world and appear as realities. Thus is the illusion of dreams also explained. This indeed after a fashion gives an account of the facts. And yet it certainly fails to explain the extraordinary vivacity and completeness of so many of our

[1] *Le Sommeil et les Rêves* (1865), chaps. III, IV.

[2] This *theory of incomplete* [illegible] of the lone images by their usual reductives is most brilliantly stated by M. Taine in his work on *Intelligence*, book II, chap. I.

dream fantasms The process of 'imagining' must (in these cases at least) be not merely relatively but absolutely and in itself more intense than at other times The fact is it is not a process of imagining but a genuine sensational process and the theory in question is therefore false as far as that point is concerned

Dr Hughlings Jackson s explanation of the epileptic seizure is acknowledged to be materially It involves principles exactly like those which I am bringing forward here. The loss of consciousness in epilepsy is due to the most highly organized brain processes being exhausted and thrown out of gear The less organized (more instinctive) processes ordinarily inhibited by the others are then exalted so that we get as a mere consequence of relief from the inhibition the meaningless or maniacal action which so often follows the attack.

Similarly the *subsultus tendinorum* or jerking of the muscles which so often startles us when we are on the point of falling asleep may be interpreted as due to the rise (in certain lower motor centres) of the ordinary tonic tension to the explosion-point, when the inhibition commonly exerted by the higher centres falls too suddenly away

One possible condition of hallucination then stands revealed whatever other conditions there may be *When the normal paths of association between a centre and o her centres are thrown out of gear any act ity which may exist in the first cent e tends to increase in intens ty until finally the point may be reached at which the last inward resistance is overcome and the full sensational*

on Inhibition in *B ain*, xi, p. 35

The loss f vivacity in the images in the process f waking as well as th gain of t in falling asleep, are both well described by M. Tame, wh writes (*In. ugence* I, pp 50, 58) tha often in the daytime, when fatig ed and seated in chair it is ufficient for him t close one ey with handkerch f when, by degrees, th sight f th th ey becomes vague, and t closes. All external sensations are gradually effaced cease, t all vents, to be remarked t internal images, the ther hand, feeble and rapid during th state f m

being sleep comes on, and I kn w no more f the real world I am in. Many times, like M. M ury I ha caused myself to be gently roused at different moments f this state, and have thus been able t mark its characters.—Th intense image which seems an external bject is but more f rcible continuation of the feeble imag which an instant bef I recognized as internal some scrap of f rest, some h use, some perso which I vaguely imagined on closing my eyes, has in minut become present t m with full bodily details, so as to change into complete hallucination. Then, waking p on hand touching me, I feel th figure decay lose colo and evaporate what had appeared s bstance is red ced to shadow In such case, I have ten seen, f passing moment, the image grow pale waste way and evaporate sometimes, on pening the yes, fragment f landscape or th skirt f dress ppears still to float ver the fire r ns n th back hearth This persistence f dream-objects for few moments after th eyes ar pened seems to be tremely rare experience Many cases f t ha e been eported to me directly *Cf* Muller *Physiology* B ly tr p. 945.

process explodes.[1] Thus it will happen that causes of an amount of activity in brain cells which would ordinarily result in a weak consciousness may produce a very strong consciousness when the overflow of these cells is stopped by the torpor of the rest of the brain. *A slight peripheral irritation, then, if it reaches the centres of consciousness at all during sleep, will give rise to the dream of a violent sensation.* All the books about dreaming are full of anecdotes which illustrate this. For example, M. Maury's nose and lips are tickled with a feather while he sleeps. He dreams he is being tortured by having a pitch plaster applied to his face, torn off, lacerating the skin of nose and lips. Descartes, on being bitten by a flea, dreams of being run through by a sword. A friend tells me, as I write this, of his hair changing its position on his forehead just as he 'dozed off' in his chair a few days since. Instantly he dreamed that some one had struck him a blow. Examples can be quoted *ad libitum*, but these are enough.[2]

We seem herewith to have an explanation for a certain number of hallucinations. *Whenever the normal forward irradiation of intra-cortical excitement through association-paths is checked, any accidental spontaneous activity, or any peripheral stimulation (however inadequate at other times) by which a brain-centre may be visited, sets up a process of full sensational intensity therein.*

In the hallucinations artificially produced in hypnotic subjects some degree of peripheral excitement seems usually to be required. The brain is asleep as far as its own spontaneous thinking goes, and the words of the 'magnetizer' then awaken a cortical process which drafts off into itself any currents of a related sort which may come in from the periphery, *resulting in a vivid objective perception of the suggested thing.* Thus, point to a dot on a sheet of paper and call it 'General Grant's photograph,' and your subject will see a photograph of the General there instead of the dot. The dot gives objectivity to the appearance, and the suggested notion of the General gives it form. Then magnify the dot by a lens; double it by a prism or by nudging the eyeball; reflect it in a mirror; turn it upside down; or wipe it out; and the subject will tell you that the 'photograph' has been enlarged, doubled, reflected, turned about, or made to disappear. In M. Binet's language[3] the dot is the outward *point de repère* which is needed to give objectivity to your suggestion, and without which the latter will

[1] I say the 'normal' paths, because hallucinations are not incompatible with *some* paths of association being left. Some hypnotic patients will not only have hallucinations of objects suggested to them, but will amplify them and act out the situation. But the paths here seem excessively narrow, and the reflections which ought to make the hallucination incredible do not occur to the subject's mind. In general, the narrower the association of ideas is, the vivider is *the consciousness of each*. Under ordinary circumstances the entire brain probably plays a part in draining any centre which may be additionally active. When the drainage is reduced in any way it probably makes the active process more intense.

[2] M. A. Maury gives a number, *op. cit.* pp. 126–8.

[3] M. Binet's highly important experiments, which were first published in vol. XVII of the *Revue philosophique* (1884), are also given in full in chapter IX of his and Féré's work on *Animal Magnetism* in the International Scientific Series. — Where there is no dot on the paper, nor any other visible mark, the subject's judgment about the portrait would seem to be guided by what he sees happening to the entire sheet.

only produce a *conception* in the subject's mind. M. Binet has shown that such a peripheral *point de repère* is used in an enormous number not only of hypnotic hallucinations, but of hallucinations of the insane. These latter are often *unilateral*; that is, the patient hears the voices always on one side of him, or sees the figure only when a certain one of his eyes is open. In many of these cases it has been distinctly proved that a morbid irritation in the internal ear or an opacity in the humors of the eye was the starting-point of the current which the patient's diseased acoustic or optical centres clothed with their peculiar products in the way of ideas. *Hallucinations produced in this way are* ILLUSIONS; *and M. Binet's theory that all hallucinations must start in the periphery may be called an attempt to reduce hallucination and illusion to one physiological type*, the type, namely, to which normal perception belongs. In every case, according to M. Binet, whether of perception, of hallucination, or of illusion, we get the sensational vividness by means of a current from the peripheral nerves. It may be a mere trace of a current. But that trace is enough to kindle the maximal or supra-ideational process, so that the object perceived will have the character of *externality*. What the *nature* of the object shall be will depend wholly on the particular system of paths in which the process is kindled. Part of the thing in all cases comes from the sense-organ, the rest is furnished by the mind. But we cannot by introspection distinguish between these parts; and our only formula for the result is that the brain has *reacted on* the impression in the normal way. Just so in the dreams which we have considered, and in the hallucinations of which M. Binet tells, we can only say that the

latter always disappear when the eyes are closed. Dr. Hack Tuke[3] gives several examples in sane people of well-exteriorized hallucinations which did not respond to Binet's tests; and Mr. Edmund Gurney[4] gives a number of reasons why intensity in a cortical process may be expected to result from local patho-

make it appear projected into real space. But since this intensity is after all but a matter of degree, one does not see why, under rare conditions, the degree in question might not be attained by inner causes exclusively. In that case we should have certain hallucinations centrally initiated alongside of the peripher

It is [illegible] difficult thin[g] t[o] distinguish in [the] hyp[no]tic pati[en]t betwee[n a] genuin[e s]ens[ori]al hallucin[a]ti[on o]f som[e]thin[g su]ggested and [a] con[ce]pti[on o]f it m[e]rely [co]upled w[i]th beli[e]f that i[t is] th[e]re. I have bee[n su]rprised [a]t th[e] vagu[en]ess with which [su]ch [su]bjects will [le]t [go ...] po[int on] blank pape[r] th[e ...] thin[gs o]f th[e] pi[ctur]es which they say they see th[ere ...] po[int]. O[n] th[e] oth[er] hand y[ou w]ill h[e]ar th[e]m sa[y] th[a]t th[e]y find [no] diff[e]rence between [a] real fl[o]wer which y[ou] sh[o]w th[e]m and an ima[gi]nary fl[o]w[er] which y[ou] tell th[e]m is besid[e i]t. Wh[en] t[o]ld that [o]ne is ima[gi]nary and that th[e]y must p[i]ck [ou]t th[e] [re]al [on]e, th[e]y som[e]times say th[e] ch[oi]ce is impossible, and sometimes they point t[o] th[e] imaginary fl[o]w[er].

Only the [o]th[er] d[a]y in thr[ee] h[y]pn[o]tized girls, I failed to d[ou]bl[e] an hall[u]cinati[on] w[i]th [a] prism. Of [co]urse it may not ha[ve] be[en a] fully devel[o]ped hallucination.

[3] *B[r]a[in]*, xi, p. 44[...].

[4] *M[i]nd*, [...] pp. [...] 6[...] 3[...] 6[...], [an]d *Ph[an]tasm[s o]f th[e] L[iving]* (1886), i, pp. 4[7]0–88.

ally initiated hallucinations which are the only sort that M Binet s theory allows *It seems probable on the whole therefore that centrally initiated hallucinations can exist* How often they do exist is another question The existence of hallucinations which affect more than one sense is an argument for central initiation For grant that the thing seen may have its starting point in the outer world the voice which it is heard to utter must be due to an influence from the visual region i e must be of central origin

Sporadic cases of hallucination visiting people only once in a lifetime (which seem to be by far the most frequent type) are on any theory hard to understand in detail They are often extraordinarily complete and the fact that many of them are reported as *veridical* that is as coinciding with real events such as accidents deaths etc of the persons seen is an additional complication of the phenomenon The first really scientific study of hallucination in all its possible bearings on the basis of a large mass of empirical material was begun by Mr Edmund Gurney and is continued by other members of the Society for Psychical Research and the Census is now being applied to several countries under the auspices of the International Congress of Experimental Psychology It is to be hoped that out of these combined labors something solid will eventually grow The facts shade off into the phenomena of motor automatism trance etc and nothing but a wide comparative study can give really instructive results [1]

The part played by the peripheral sense organ in hallucination is just as obscure as we found it in the case of imagination The things seen often seem opaque and hide the background upon which they are projected It does not follow from this however that the retina is actually involved in the vision A contrary process going on in the visual centres would prevent the retinal impression made by the outer realities from being felt and this would in mental terms be equivalent to the hiding of them by the imaginary figure The negative after images of mental pictures reported by Meyer and Fere and the negative after images of hypnotic hallucinations reported by Binet and others so far constitute the only evidence there is for the retina being involved But until these after images are explained in some other way we must admit the possibility of a centrifugal current from the optical centres downwards into the peripheral organ of sight paradoxical as the course of such a current may appear

Perception Time

The time which the perceptive process occupies has been inquired into by various experimenters Some call it perception time some choice time some discrimination time The results have been already given in Chapter xiii (p 341 ff) to which the reader is consequently referred

Dr Romanes gives an interesting variation of these time measurements He found[2]

> an astonishing difference between different individuals with re pect to the rate at which they are able to *read* Of course reading implies enormously intricate proces es of perception both of the sensuous and of the intellectual order but if we choose

[1] In Mr Gurney s work ju t cited a ry la ge number of ver dical ca es are critically discussed. [2] *M ntal Ev l t on n A al* p 136

for these observations persons who have been accustomed to read much, we may consider that they are all very much on a par with respect to the amount of practice which they have had, so that the differences in their rates of reading may fairly be attributed to real differences in their rates of forming complex perceptions in rapid succession, and not to any merely accidental differences arising from greater or less facility acquired by special practice.

My experiments consisted in marking a brief printed paragraph in a book which had never been read by any of the persons to whom it was to be presented. The paragraph, which contained simple statements of simple facts was marked on the margin with pencil. The book was then placed before the reader open, the page, however being covered with a sheet of paper Having pointed out to the reader upon this sheet of paper what part of the underlying page the marked paragraph occupied, I suddenly removed the sheet of paper with one hand, while I started a chronograph with the other Twenty seconds being allowed for reading the paragraph (ten lines octavo) as soon as the time was up I again suddenly placed the sheet of paper over the printed page, passed the book on to the next reader and repeated the experiment as before. Meanwhile, the first reader the moment after the book had been removed, wrote down all that he or she could remember having read. And so on with all the other readers.

Now the results of a number of experiments conducted on this method were to show as I have said, astonishing differences in the maximum rate of reading which is possible t di ... individual ... all of whom have been accustomed to extensive reading. That
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and power of
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written es ... than the latter are able to give and the
ha ... by the slow readers than the latter are able to give and the
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the experiment with several highly distinguished men in science and literature, most of whom I found to be slow readers

Literature The best treatment of perception with which I am acquainted is that in Mr James Sully book *Illusions* in the International Scientific Series. On hallucinations the literature is large Gurney Kandinsky (as already cited) and some articles by Kraepelin in the *Vierteljahrschrift fur Wissenschaftliche Philosophie* vol. v (88) are the most systematic studies recently made. All works Insanity treat of them. Dr W W Ireland works *The Blot upon the Brain* (1885) and *Through the Ivory Gate* (1890) have much information. the subject Gurney gives pretty complete references to older literature. The most important thing on the subject from the point of view of theory is the article by Mr Myers on the Demon of Socrates in the *Proceedings of the Society for Psychical Research* for 1889, p. 5

Chapter XX

THE PERCEPTION OF SPACE

The Feeling of Crude Extensity

In *the sensations of hearing touch sight and pain we are accustomed to distinguish from among the other elements the element of voluminousness* We call the reverberations of a thunderstorm more voluminous than the squeaking of a slate pencil the entrance into a warm bath gives our skin a more massive feeling than the prick of a pin a little neuralgic pain fine as a cobweb in the face seems less extensive than the heavy soreness of a boil or the vast discomfort of a colic or a lumbago and a solitary star looks smaller than the noonday sky In the sensation of dizziness or subjective motion which recent investigation has proved to be connected with stimulation of the semi circular canals of the ear the spatial character is very prominent Whether the muscular sense directly yields us knowledge of space is still a matter of litigation among psychologists Whilst some go so far as to ascribe our entire cognition of extension to its exclusive aid others deny to it all extensive quality whatever Under these circumstances we shall do better to adjourn its consideration admitting however that it seems at first sight as if we felt something decidedly more voluminous when we contract our thigh muscles than when we twitch an eyelid or some small muscle in the face It seems moreover as if this difference lay in the feeling of the thigh muscles themselves

In the sensations of smell and taste this element of varying vastness seems less prominent but not altogether absent Some tastes and smells appear less extensive than complex flavors like that of roast meat or plum pudding on the one hand or heavy odors like musk or tuberose on the other The epithet *sharp* given to the acid class would seem to show that to the popular mind there is something narrow and as it were streaky in the impression they make other flavors and odors being bigger and rounder

The sensations derived from the inward organs are also distinctly more or less voluminous Repletion and emptiness suffocation palpitation headache are examples of this and certainly not less spatial is the consciousness we have of our general bodily condition in nausea fever heavy drowsiness and fatigue Our entire cubic content seems then sensibly manifest to us as such and feels much larger than any local pulsation pressure or discomfort Skin and retina are however the organs in which the space element plays the most active part Not only does the maximal vastness yielded by the retina surpass that yielded by any other organ but the intricacy with which our attention can subdivide this vastness and perceive it to be composed of lesser portions simultaneously coexisting alongside of each other is without a parallel elsewhere [1] The ear gives

[1] Prof Jastrow has found [illegible] skin which [illegible] stimulated [illegible] visual space that is when asked [illegible] paper [illegible] of skin affected [illegible]

a greater vastness than the skin but is considerably less able to subdivide it.[1]

Now my first thesis is that this element discernible in each and every sensation though more developed in some than in others is the original sensation of space out of which all the exact knowled e about space that we afterwards come to have is woven by processes of discrimination association and selection. Extensity as Mr James Ward calls it, on this view becomes an element in each sensation just as intensity is The latter every one will admit to be a distinguishable thou h not separable ingredient of the sensible quality In like manner extensity being an entirely peculiar kind of feeling indescribable except in terms of itself and inseparable in actual experience from some sensational quality which it must accompany can itself receive no other name than that of *sensational element*

It must now be noted that *the vastness hitherto spoken of is as great in one direct on as in another* Its dimensions are so vague that in it there is no question as yet of surface as opposed to depth "volume bein the best short name for the sensation in question. *Sensations of different orders are roughly comparable inter se with espect to th ir olumes* This shows that the spatial quality in each is identical wherever found for different qualitative elements, e.g., warmth and odor are incommensurate. Persons born blind are reported surprised at the largeness with which objects appear to them when their sight is restored Franz says of his patient cured of cataract He saw everythin much l h h d supposed from the idea obtained by his sense of touch. Mov

between us and their source and in the case of certain ones the cricket s song the whistlin of the wind the roarin of the surf or a distant railway train to have no definite starting point.

In the sphere of ision we have facts of the same order "Glowing' bodies, as Hering says give us a perception which seems *oomy* [*raumhaft*] in comparison with that of strictly surface color A glowing iron looks luminous throu h and throu h and so does a flame.[4] A luminous fo a band of sunshine affect us in the same way As Hering urges

> We must disting h *omy* from superficial, as well as distinctly from indistinctly bounded, sensations. The dark which with closed eyes one sees before e is for example, oomy sensation. We do not see a black surface like a wall in f nt of us, but space filled with darkness, and even when we succeed in seein this darkness

draw it much too small. This sh ws that the eye gets as m ch space feelin from the smaller line as the skin gets from the larger one. *Cf* Jastr w *Mind* xi, pp 5 6–47 in *American J rnal f Psychology* iii, p 53

Amongst sounds the gra er ones seem the most extensi e. Stumpf gi es three reasons f th) associatio with bigger causes) wider reverberatio f th hand and body when gra e notes are ung 3) udibility at greater distance. He thinks that these three reasons dispense us from supposin an immanent extensi in the sensati f sound as such. See his remarks in the *Ton y kologie* pp

Encyclopædia Britannica, 9th Edition, article Psych logy pp. 46, 53.

Philosophical T nsactions (84)

Hermann *Hand b d. Physiol* ol. iii, 1, § 5 5.

Chapter XX

THE PERCEPTION OF SPACE

The Feeling of Crude Extensity

In the sensations of hearing touch sight and pain we are accustomed to distinguish from among the other elements the element of voluminousness We call the reverberations of a thunderstorm more voluminous than the squeaking of a slate pencil the entrance into a warm bath gives our skin a more massive feeling than the prick of a pin a little neuralgic pain fine as a cobweb in the face seems less extensive than the heavy soreness of a boil or the vast discomfort of a colic or a lumbago and a solitary star looks smaller than the noonday sky In the sensation of dizziness or subjective motion which recent investigation has proved to be connected with stimulation of the semi circular canals of the ear the spatial character is very prominent Whether the muscular sense directly yields us knowledge of space is still a matter of litigation among psychologists Whilst some go so far as to ascribe our entire cognition of extension to its exclusive aid others deny to it all extensive quality whatever Under these circumstances we shall do better to adjourn its consideration admitting however that it seems at first sight as if we felt something decidedly more voluminous when we contract our thigh muscles than when we twitch an eye lid or some small muscle in the face It seems moreover as if this difference lay in the feeling of the thigh muscles themselves

In the sensations of smell and taste this element of varying vastness seems less prominent but not altogether absent Some tastes and smells appear less extensive than complex flavors like that of roast meat or plum pudding on the one hand or heavy odors like musk or tuberose on the other The epithet *sharp* given to the acid class would seem to show that to the popular mind there is something narrow and as it were streaky in the impression they make other flavors and odors being bigger and rounder

The sensations derived from the inward organs are also distinctly more or less voluminous Repletion and emptiness suffocation palpitation headache are examples of this and certainly not less spatial is the consciousness we have of our general bodily condition in nausea fever heavy drowsiness and fatigue Our entire cubic content seems then sensibly manifest to us as such and feels much larger than any local pulsation pressure or discomfort Skin and retina are however the organs in which the space element plays the most active part Not only does the maximal vastness yielded by the retina surpass that yielded by any other organ but the intricacy with which our attention can subdivide this vastness and perceive it to be composed of lesser portions simultaneously coexisting alongside of each other is without a parallel elsewhere The ear gives

[1] P of Ja trow h [illegible] und th t n [illegible] bl w t nd t [illegible] th am unt f ur skin wh h m [illegible] timul s d b [illegible] nta t th an b [illegible] h n [illegible] xp ss it in t ms f visual space that is when asked t mark n p pe th [illegible] t nt of k n affect d [illegible] always

the changes are not perceived as takin place in the external world they occupy a vague internal space located within the head

In the skin itself there is a vague form of projection into the third dimension to which Hering has called attention

Heat s not felt nly against the cutaneous surface *but when communicated* through the air may appear *extending* more or less out from the surface into the third dimension of surrounding spac We can determine in the dark the place of a radiant body by m ing the hand to and f and attending to the fluctuation of our feeling of warmth. The feeling *tself however is not projected* fully into the spot at which we localize the hot body but always remains in the neighborhood of the hand.

The interior of one s mouth-cav ty feels larger when explored by the tongue than when looked at. The crater of a newly-extracted tooth and the movements of a loose tooth in its socket *feel quite monstrous* A midge buzzing against the drum of the ear will often seem as bi as a butterfly The spatial sensibil ty of the tympanic membrane has hitherto been very little studied though the subject will well repay much trouble If we approach it by introducing into the outer ear some small object like the tip of a rolled up tissue-paper lampl ghter we are surpri ed at the large radiating sensation which its presence gi es us and at the sense of clearness and openness which comes when it is removed It is immaterial to inquire whether the far reachin sensation he e be due to actual irradiation upon di tant nerves or not. We are considering now not the objective causes of the spatial feelin but its subjective varieties and the experiment shows that the same object gives more of it to the inner than to the outer cuticle of the ear The pressure of the air in the tympanic cavity upon the membrane gives an astonishingly large sensation We can increase the p essure by holding our nostrils and closin our mouth and forcing air through our Eustachian tubes by an expiratory effort and we can diminish it by e ther insp ring or swallowing under the same conditions of closed mouth and nose In either case we get a large round tridimensional sensation inside of the head which seems as if t must come *from the affection of an o gan much larger* than the tympanic membrane whose surface hardly exceeds that of one s little-finger nail.

1

distinctly t as sensatio f tension in th insid f the head, b t as feeling f train and co tractio in th scalp, with pressure f m twards in er the wh l cranium, undo btedly caused by contractio f the muscles f the scalp This harmonizes ery well with the expressions, *sich den K pf erbr hen de K pf ist mmernehme* I f rmer illness hen I could t endure the sl htest ffort afte contin us th ght and had no theoretical bias this q estion the muscles f the scalp especially those f the back head, assumed fairly mo bid degree f sensibility whenever I tried to think. (*Elem der P hophysik* ii, pp. 490-9)

as terminated by a black wall there still remains in front of this wall the dark space The same thing happens when we find ourselves with open eyes in an absolutely dark room This sensation of darkness is also vaguely bounded An example of a distinctly bounded roomy sensation is that of a clear and colored fluid seen in a glass the yellow of the wine is seen not only on the bounding surface of the glass the yellow sensation fills the whole interior of the glass By day the so called empty space between us and objects seen appears very different from what it is by night. The increasing darkness settles not only upon the things but also *between* us and the things so as at last to cover them completely and fill the space alone If I look into a dark box I find it *filled* with darkness and this is seen not merely as the dark colored sides or walls of the box A shady corner in an otherwise well lighted room is full of a darkness which is not only *on* the walls and floor but *between* them in the space they include Every sensation is there where I experience it and if I have it at once at every point of a certain roomy space it is then a voluminous sensation A cube of transparent green glass gives us a spatial sensation an opaque cube painted green on the contrary only sensations of surface [1]

There are certain quasi motor sensations in the head when we change the direction of the attention which equally seem to involve three dimensions If with closed eyes we think of the top of the house and then of the cellar, of the distance in front of us and then of that behind us of space far to the right and then far to the left we have something far stronger than an idea —an actual feeling namely as if something in the head moved into another direction Fechner was I believe the first to publish any remarks on these feelings He writes as follows

When we transfer the attention from objects of one sense to those of another we have an indescribable feeling (though at the same time one perfectly determinate and reproducible at pleasure) of altered direction or differently localized tension [*Spannung*] We feel a strain forward in the eyes one directed sideways in the ears increasing with the degree of our attention and changing according as we look at an object carefully or listen to something attentively wherefore we speak of *straining the attention* The difference is most plainly felt when the attention vibrates rapidly between eye and ear This feeling localizes itself with most decided difference in regard to the various sense organs according as we wish to discriminate a thing delicately by touch taste or smell

But now I have when I try to vividly recall a picture of memory or fancy a feeling perfectly analogous to that which I experience when I seek to grasp a thing keenly by eye or ear and this analogous feeling is very differently localized. While in sharpest possible attention to real objects (as well as to after images) the strain is plainly forwards and when the attention changes from one sense to another only alters its direction between the sense organs leaving the rest of the head free from strain the case is different in memory or fancy for here the feeling withdraws entirely from the external sense organs and seems rather to take refuge in that part of the head which the brain fills If I wish for example to recall a place or person it will arise before me with vividness not according as I strain my attention forwards but rather in proportion as I so to speak retract it backwards [2]

It appears probable that the feelings which Fechner describes are in part constituted by imaginary semi circular canal sensations [3] These undoubtedly convey the most delicate perception of change in direction and when as here

[1] Loc cit § 572 Ele t d Psychophysik ii pp 475–76

[3] See Foster s *Text book of Physiology* bk iii, chap vi, § 2

to contract again in the palm and finally diverge rapidly again towards the finger tips The dotted lines in Figs 51 and 52 represent the true path of the compass points the full lines their apparent path

The same len th of skin moreover will convey a more extensive sensation accordin to the manner of stimula tion If the edge of a card be pressed against the skin the distance between its extremities will seem shorter than that between two compass tips touching the same terminal points[1]

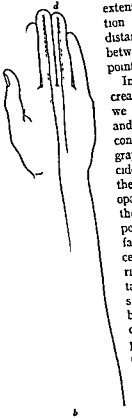


FIG 5 (ft W be)

In the eye intensity of nerve stimulation seems to in crease the *volume* of the feeling as well as its brilliancy If we raise and lower the gas alternately the whole room and all the objects in it seem alternately to enlarge and contract If we cover half a page of small print with a gray glass the print seen through the glass appears decidedly smaller than that seen outside of it and the darker the glass the greater the difference When a circumscribed opacity in front of the retina keeps off part of the light from the portion wh ch it covers objects projected on that port on may seem but half as large as when their image falls outside of it. The inver e effect seems produced by certain drugs and anæsthetics Morphine atropine datu rine and cold blunt the sensibility of the skin so that distances upon it seem less Hashish produces strange perver s ons of the general sensibil ty Under its influence one s body may seem either enormously enlarged or strangely contracted Sometimes a single member will alter its pro portion to the rest or one s back for instance will appear entirely absent as if one were hollow beh nd Objects comparatively near will recede to a vast distance a short street assume to the eye an immeasurable perspective. Ether and chloroform occasionally produce not wholly dissim lar results Panum the German physiologist relates that when as a boy he was etherized for neuralgia the objects in the room grew extremely small and distant before his field of vi sion darkened over and the roa ing in his ears began He also mentions that a fr end of his n chu ch struggling in vain to keep awake saw the preacher grow smaller and smaller and more and more distant I myself on one occas on observed the same recession of objects during the beginning of chloroformization In var ous cerebral diseases we find analogous disturbances

Th sk seems t bey different law f m th ey h If gi tinal tr ct be ex

patte and f m th pposit dg tting t all b t th tw corn s, and th mparing th feelings used by th t d es when h ld gainst th skin.

Classe *Phy iol g d G schiss* p 4 see also A. Riehl *D Ph'lo ph he Kriticismus* ii, p. 49

The tympanic membrane is furthermore able to render sensible differences in the pressure of the external atmosphere too slight to be felt either as noise or in this more violent way If the reader will sit with closed eyes and let a friend approximate some solid object like a large book noiselessly to his face, he will immediately become aware of the object s presence and position—likewise of

its felt quality in those whose attention is called to it for the first time belongs to it *qua* sensation and owes nothing to educational suggestions But this felt quality is most distinctly and un
three dimensions—quite as much
when we lie on our back and fill t
sky When an object is brought near the ear we immediately feel shut in con tracted when the object is removed we suddenly feel as if a transparency clearness openness had been made outside of us And the feeling will by any one who will take the pains to observe it be acknowledged to involve the third dimension in a vague unmeasured state [1]

The reader will have noticed in this enumeration of facts that *voluminous ness of the feeling seems to bear very little relation to the si e of the organ that yields it* The ear and eye are comparatively minute organs yet they give us feelings of great volume The same lack of exact proportion between size of feel ing and size of organ affected obtains within the limits of particular sensory or gans An object appears smaller on the lateral portions of the retina than it does on the fovea as may be easily verified by holding the two forefingers parallel and a couple of inches apart and transferring the gaze of one eye from one to the other Then the finger not directly looked at will appear to shrink and this whatever be the direction of the fingers On the tongue a crumb or the calibre of a small tube appears larger than between the fingers If two points kept equi distant (blunted compass or scissors points for example) be drawn across the skin so as really to describe a pair of parallel lines the lines will appear farther apart in some spots than in others If for example we draw them horizontally across the face so that the mouth falls between them the person experimented upon will feel as if they began to diverge near the mouth and to in clude it in a well marked ellipse In like manner if we keep the compass points one or two centimetres apart and draw them down the forearm over the wrist and palm finally drawing one along one finger the other along its neighbor the appearance will be that of a single line soon breaking into two which become more widely separated below the wrist



Fig 51 (after Weber)

[1] That the sensation in que tion is one of tactile rather than of acoustic sensib lity would seem proved by the fact that a medical friend of the writer both of whose memb a tym pa are quite normal but one of wh se ears is almost totally deaf feels the presence and withdrawal of objects as well at one ear as t the other

The Perception of Spatial Order

So far all we have
vague form or *quale* [illegible]
other peculiarities of each and every one of our sensations [illegible]
amples we have adduced of the variations of this extensive element have only been meant to make clear its strictly sensational character In very few of them will the reader have been able to explain the variation by an added intellectual element such as the suggestion of a recollected experience In almost all [illegible] effect of a peculiar sort of nerve-
[illegible]
which *p* [illegible] *ely* at least, no *order of parts* or [illegible]

Let no one be surprised at this notion of a space without order There may be a space without order just as there may be an order without space And the primitive perceptions of space are certainly of an unordered kind The order which the spaces first perceived potentially include must before being distinctly apprehended by the mind be woven into those spaces by a rather complicated set of intellectual acts The primordial largenesses which the sensations yield must be *measu ed and subdi ded* by consciousness and *added* to ether before [illegible] what we know as the real Space of the objective

[illegible]

[illegible] es behind imag ned [illegible] es that it is no wo der if some auth [illegible] as to th [illegible] that the sense-data have no spatial worth at all and that the intellect [illegible] t makes the subdivisions also gives the spatial quality to them out of resources of its own

As for ourselves having found that all our sensations (however as yet unconnected and undiscriminated) are of extensive objects our next problem is *How do we* ARRANGE *these at first chaotically given spaces into the one regular and* [illegible] *of space which we now know?*

T[illegible] begin with there is no reason to suppose that the several sense-spaces of which a sentient creature may become conscious each filled with its own pe-

---

[illegible]

1 [illegible] plaining [illegible] shape [illegible] th[illegible] pace perc[illegible] ed by th[illegible] shape [illegible] th[illegible] erv[illegible] pans[illegible] ffected [illegible] If his al[illegible]ne [illegible] necessary w[illegible] sh[illegible]uld h[illegible] square inches [illegible]nd half inches, and [illegible] ther f[illegible]ms rectilin[illegible]ar [illegible]d curvilinear [illegible] f fra[illegible]nc[illegible] and sound. (*Lectur[illegible]* XXII.) Musical [illegible]es, [illegible] ha[illegible] an[illegible] d[illegible] f quality indepe[illegible]d[illegible] [illegible]her f their pa[illegible] tun[illegible] de[illegible] Music [illegible]mes [illegible] m th[illegible] [illegible] der [illegible] th[illegible] tes [illegible]psetti[illegible]g their quality [illegible]der In g[illegible] al if [illegible] b[illegible] *d* [illegible] *f g h* [illegible] *j k* etc., [illegible]tand f[illegible] arrang[illegible]ment [illegible] feeling in th[illegible] rd[illegible] [illegible] th[illegible]ir qual[illegible] th[illegible] ma[illegible] [illegible] m[illegible] y pa[illegible] -orde[illegible] time-o[illegible] d[illegible] as *d* [illegible] *f* [illegible] *h g*, [illegible]tc., and still th[illegible] de[illegible] f quality [illegible] remain fixed and unchanged.

Can we assign the physiolog cal conditions which make the elementary sen sible largeness of one sensation vary so much from that of another? Only im perfectly One factor in the result undoubtedly is the number of nerve-termi nations simultaneously excited by the outward agent that awakens the sensa tion When many skin nerves are warmed or much retinal surface illuminated our feeling is larger than when a lesser nervous surface is excited The single sensation yielded by two compass points although it seems simple is yet felt to be much bigger and blunter than that yielded by one The touch of a single point may always be recognized by its quality of sharpness This page looks much smaller to the reader if he closes one eye than if both eyes are open So does the moon which latter fact shows that the phenomenon has nothing to do with parallax The celebrated boy couched for the cataract by Cheselden thought after his first eye was operated all things he saw extremely large, but being couched of his second eye said that objects at first appeared large to this eye but not so large as they did at first to the other and looking upon the same object with both eyes he thought it looked about twice as large as with the first couched eve only but not double that we can anyways discover

The greater extensiveness that the feeling of certain parts of the same sur face has over other parts and that one order of surface has over another (ret ina over skin for example) may also to a certain extent be explained by the operation of the same factor It is an anatomical fact that the most spatially sensitive surfaces (retina tongue fingertips etc) are supplied by nerve trunks of unusual thickness which must supply to every unit of surface area an unusually large number of terminal fibres But the variations of felt exten sion obey probably only a very rough law of numerical proportion to the num ber of fibres A sound is not twice as voluminous to two ears as to one and the above cited variations of feeling when the same surface is excited under dif ferent conditions show that the feeling is a resultant of several factors of which the anatomical one is only the principal Many ingenious hypotheses have been brought forward to assign the co operating factors where different conditions give conflicting amounts of felt space Later we shall analyze some of these cases in detail but it must be confessed here in advance that many of them resist analysis altogether [1]

We hear it untiringly re terated by materi lists and spiritualists alike that we can see no

m nd is itself a triangle etc it looks at first sight as if the sensat on might be a d rect cogni tion of its own neural condition Were this true however our sensation should be one of

lead to a repre entation in the m nd f the subject ob erved s milar to that wl ich it pro duces in the psychological observer In no other kind of case is the co ncidenc found Even

The Perception of Spatial Order

So far all we h [illegible]
vague form or qu[illegible]
other peculiarities of each and every one of our sensations [illegible]
amples we have [illegible]dduced of the variations of this extensive element have only
been meant to make clear its strictly sensational character In very few of
them will the reader have been able to explain the variation by an added intel
lectual element such as the suggestion of a recollected experience In almost
[illegible] h[illegible] ffect of a peculiar sort of nerve-

[illegible]

which prim[illegible]ely at least, no order of par[illegible]

Let no one be surprised at this notion of a space without order There may be a space without order just as there may be an order without space And the primitive perceptions of space are certainly of an unordered kind The order which the spaces first perceived potentially include must before being distinctly [a]pprehended by the mind be woven into those [s]paces by a rather complicated set of intellectual acts The primordial largenesses which the sensations yield must be *measured and subdi[vi]ded* by consciousness and *added* to [tog]ether before they can form by their synthesis what we know as the real Space of the objective wo[r]ld In these operations imagination association attention and selection [illegible] d[illegible] h[illegible]gh they nowhere add any new material to the p[illegible]

[illegible]

[he]nce it makes the subdivisions also gives the spatial quality to them [illegible]
sources of its own

As for ourselves having found that all our sensations (however as yet unconnected and undiscriminated) are of extens[iv]e objects *ou[r n]ext problem is How do we* ARRANGE *these at fi[r]st chaot[i]cally gi[v]en spaces into the one [r]egular and o[rder]ly [illegible]d of space [w]hich we now know?*

T[o] be[gi]n with there is no [r]eason to suppose that the several sense-[s]paces of wh[i]ch a sentient creature may become conscious each filled with its own pe-

---

sh[ou]ld w[e] admit that w[e] [reco]gnize triangles in space because [illegible] immediat[e] cogniti[on] [o]f [t]h[e] [illegible] shape [o]f [illegible] excited gr[ou]p [o]f [n]er[v]e tips, th[e] matter w[ou]ld hardly be m[ade] [illegible] th[e] mystery w[o]uld [s]till [r]emain, why are w[e] so m[u]ch better cognizant [o]f [tri]angles on [illegible] finger tips tha[n] [illegible] th[e] [n]erv[e] tips [o]f [o]ur back, [illegible]ey than [o]ur ear [illegible] an[y] [o]f these parts than in [o]ur brain? Th[o]mas Brown [ve]ry rightly rejects th[e] [no]tio[n] [o]f [e]xplaining th[e] [s]hape [o]f th[e] [s]pace percei[v]ed by th[e] shape [o]f the [n]erv[o]us expans[ion] [illegible]cted If his al[o]ne w[ere] necessary w[e] [s]h[o]uld ha[ve] square inches and half inches, and [o]ther f[o]rms rectilinear and curvilinear [o]f fraganc[e] and sound. (*Lectur[e]* XXII.) Musical [to]nes, [illegible] ha[illegible] d [illegible] [o]f quality independ[en]t [o]f their [s]pace [illegible] tim[e] [o]rde[r] Musi[c] [illegible] [fro]m th[e] tim[e]-o[r]de[r] [o]f the [no]tes [illegible] their quality-o[r]der In general, if *b d f g h j k* et[c.] [s]tand f[or] an arrangement [o]f feelings in th[e] [o]rd[er] [o]f their q[ua]l[i]t[y] they ma[y] a[ss]um[e] [an]y [s]pace-order [or] time-o[r]der as *d [illegible] f [illegible] h g*, etc., and still the orde[r] [o]f quality will remain fixed and unchanged.

cular content, should tend simply *because they are many* to enter into any definite spatial intercourse with each other or lie in any particular order of positions Even in ourselves we can recognize this. Different feelings may coexist in us without assuming any particular spatial order The sound of the brook near which I write the odor of the cedars the comfort with which my breakfast has filled me and my interest in this paragraph all lie distinct in my consciousness but in no sense outside or alongside of each other Their spaces are interfused and at most fill the same vaguely objective world Even where the qualities are far less disparate we may have something similar If we take our subjective and corporeal sensations alone there are moments when as we lie or sit motionless we find it very difficult to feel distinctly the length of our back or the direction of our feet from our shoulders By a strong effort we can succeed in dispersing our attention impartially over our whole person and then we feel the real shape of our body in a sort of unitary way But in general a few parts are strongly emphasized to consciousness and the rest sink out of notice and it is then remarkable how vague and ambiguous our perception of their relative order of location is Obviously for the orderly arrangement of a multitude of sense spaces in consciousness something more than their mere separate existence is required What is this further condition?

If a number of sensible extents are to be perceived alongside of each other and in definite o ... *is in a aster sensible extent which can enter the m*
of estimatir
fact that it ...
to that of thinking forwards and backwards simultaneously ...
our head we tend to grow unconscious of our feet and there enters thus an element of time succession into our perception of ourselves which transforms the latter from an act of intuition to one of construction This element of construct ... and carries with it the same conseque
look
streets have to be thus constructed from data appreh ...
the result is a greater or less degree of vagueness

That a sensation *be discriminated as a part* from out of a larger enveloping space is then the *conditio sine qua non* of its being apprehended in a definite spatial order The problem of ordering our feelings in space is then in the first instance a problem of discrimination but not of discrimination pure and simple for then not only coexistent sights but coexistent sounds would necessarily assume such order which they notoriously do not Whatever is discriminated will appear as a small space within a larger space it is true but this is but the very rudiment of order For the location of it within that space to become precise other conditions still must supervene and the best way to study what they are will be to pause for a little and analyze *what the expression spatial order' means*

Spatial order is an abstract term The concrete perceptions which it covers are figures directions positions magnitudes and distances To single out any one of these things from a total vastness is partially to introduce order into the

vastness. To
hend it in a
begin with ..
ties of sensation just as the total vastness is in which ...
square a circle and a triangle appear in the first instance to the eye simply as three different kinds of impressions each so peculiar that we should recognize it if it were to return When Nunnely s patient had his cataracts removed and a cube and a sphere were presented to his notice he could at once perceive a difference in their shapes and though he could not say which was the cube and which the sphere he saw they were not of the same figure So of lines If we can notice lines at all in our field of vision it is inconceivable that a vertical one should not affect us differentl from an horizontal one and should not be recognized as affecting us similarly when presented again although we might not yet know the name vertical or any of its connotations beyond this peculiar affection of our sensibility So of angles an obtuse one affects our feeling immediately in a different way from an acute one Distance-apart too is a simple sensation—the sensation of a line joining the two distant points lengthen the line you alter the feelin and with it the distance felt.

Space relations

But with distance and direction we pass to the category of space-*relations* and are immediately confronted by an opinion which makes of all relations somethin *t to cœlo* different from all facts of feeling or imagination whatsoever A relation for the Platonizin school in psychology is an energy of pure thou ht and as such is quite incommensurable with the data of sensibility between which it may be perce ed to obtain

We ma c nsequently imagine a disciple of this school to say to us at this po nt S ppose you *have* made a separate specific sensation of each line and each angle what boots it? You have till the order of directions and of distances to account fo you have still the relative magnitudes of all these felt figures to tate ou ha e their respecti e positions to define before you can be said to ha e brou ht order into your space. And not one of these determinations can be effected e cept through an act of relating thought so that your attempt to give an account of space in terms of pure sensibility breaks down almo t at the very tset *Posit o* for example can never be a sensation for it has nothin in trins c abo t t it can only obtain *between* a spot line or other figure and *ex t ... eous co-ord ...ates* and can never be an element of the sensible datum the lin the spot in itself Let us then confess that Thought alone can unlock the riddle of space and that Thou ht is an adorable but unfathomable mystery

S ch a method of dealing w th the problem has the merit of shortness Let us h wever be in no such hurry but see whether we cannot get a little deeper b pat ently consi erin what these space-relations are

making sure wherever we have to employ it what its precise meaning is in that particular sphere of appl cation At present we ha e to do with space-re-

lations and no others Most relations' are feelings of an entirely different order from the terms they relate The relation of similarity e g may equally obtain between jasmine and tuberose or between Mr Browning s verses and Mr Story s it is itself neither odorous nor poetical and those may well be pardoned who have denied to it all sensational content whatever But just as in the field of quantity the relation between two numbers is another number so *in the field of space the relations are facts of the same order with the facts they relate If these latter be patches in the circle of vision the former are certain other patches between them* When we speak of the relation of direction of two points toward each other we mean simply the sensation of the line that joins the two points together *The line is the relation* feel it and you feel the relation see it and you see the relation nor can you in any conceivable way think the latter except by imagining the former (however vaguely) or describe or indicate the one except by pointing to the other And the moment you have imagined the line the relation stands before you in all its completeness with nothing further to be done Just so the relation of *direction* between two lines is identical with the peculiar sensation of shape of the space enclosed between them This is commonly called an angular relation

If these relations are sensations no less so are the relations of position *The relation of position between the top and bottom points of a vertical line is that line* and nothing else The relations of position between a point and a horizontal line below it are potentially numerous There is one more important than the rest called its distance This is the sensation ideal or actual of a perpendicular drawn from the point to the line [1] Two lines one from each extremity of the horizontal to the point give us a peculiar sensation of triangularity This feeling may be said to constitute the *locus* of all the relations of position of the elements in question *Rightness and leftness upness and downness are again pure sensations* [illegible] pecifically from each other and generically from everything else [illegible] not described If we take a cub [illegible] ird *front* and a fourth *back* there remains no form of words by which we can describe to another person which of the remaining sides is *right* and which *left* We can only point and say *here* is right and *there* is left just as we should say *this* is red and *that* blue Of two points seen beside each other at all one is always affected by one of these feelings and the other by the opposite *the same is true of the extremities of any line* [2]

[1] The whole cience of geometry may be said to owe its b ng to the *exorbitant interest* which the human mind takes in *l[illegible] es* We cut spac up in e ery di ection in o der to ma u facture them

[2] Kant was I believe the first to call attent [illegible] out that t [illegible] *opposite spherical tri ngles, two* [illegible] trary d ections have d ntical inward determ [illegible] relat on *to each other* by the same law and so [illegible] the mpossibil ty *of their mutual s perposition* [illegible] metrical pair a [illegible] mination or rel [illegible] outlying pace [illegible] is perceived *on* [illegible] tu tion In th se last w rds (*w lches u* [illegible] *ll lbar a f A sc* [illegible] § 12) Kant expresses all that we have meant by spe king f up a d down r ght and left as

— re in lubitable that all pace relations except those of magni
B it magnitude ap-
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mpossible then that such relations so
spatial feeling This we must admit the relation of quantity is generic and oc curs in many categories of consciousness whilst the other relations we have con sidered are specific and occur in pace alone When our attention passes from a horter line to a lon er from a smaller spot to a lar er from a feebler l ght to a stronger from a paler blue to a richer from a march tune to a gallop the
t h field of consciousness by a peculiar
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or we
from a short vertical line to a long horizontal one from a small sq
circle a between those figures whose shapes are congru ous Bu
good de
analyti
shape
pace and is so envisaged The same exact sensation
able to superpose one line or figure on another This indispensable condition of exact measurement of the *more* has led some to think that the feeling itself arose in every case f om original expe iences of superposition This is probably not an absolutely true opinion but for our present purpose that is immaterial So far as the subdivis ons of a sense space are to be *measured* exactly against each other objective forms occupying one subdivision must directly or indirectly be supe posed upon the other and the mind must get the immediate feeling of an outstanding *plus* And even where we only feel one subdivision to be vaguely *large* or less *the mind must pass rapidly between it and the other subdivision* and rece e the immediate sens ble shock of the *more*

We seem thus to have accou ted for all space elat ons and made them clear t r underst nding They are nothing but sensations of particular l es par t c l r a gles pa ticula for s of transition or (in the case of a *dist ct more*) *of pa ticula o tsta d ng po tions of space after two figures have been super p sed* These relat on sensations may actually be produced as such as when a

deta led subdivis on cognizance and measurement of the space considered *The b g ng of subd visions to co sc o sness constitutes then the entire proc e s by which we pass f om our fi st vague feel ng of a total vastness to a cogni t o of the vastness n detail* The more numerous the subdivis ons are the

sensations H is wrong b w in in king relatio to extrinsic t tal p ce as essential the existence f these trasts in figures. Relati n to ur wn body is ugh

more elaborate and perfect the cognition becomes But inasmuch as all the subdivisions are themselves sensations and even the feeling of more or less is, where not itself a figure at least a sensation of transition between two sensations of figure it follows for aught we can as yet see to the contrary that *all spatial knowledge is sensational at bottom* and that as the sensations lie together in the unity of consciousness no new material element whatever comes to them from a supra sensible source [1]

The bringing of subdivisions to consciousness! This then is our next topic They may be brought to consciousness under three aspects in respect of their *locality* in respect of their *si e* in respect of their *shape*

The Meaning of Localization

Confining ourselves to the problem of locality for the present let us begin with the simple case of a sensitive surface only two points of which receive stimulation from without How first are these two points felt as alongside of each other with an interval of space between them? We must be conscious of two things for this of the duality of the excited points and of the extensiveness of the unexcited interval The duality alone although a necessary is not a sufficient condition of the spatial separation We may for instance discern two sounds in the same place sweet and sour in the same lemonade warm and cold ... pointed contact in the same place on the skin etc [2] In all dis... the mind is the ... If our two ex... perforce appear to the mind as one ... not localized apart Spots four centimetres distant on the back have no qualitative con... sensation Points less than three thousandths

try ... cognised th... something l... us come to feel as if the ... d or narrow blue r red

Another rea on why the mere feel ng of ... number of lines and ar... ense of this indefinite relations of place and m... can be exh usti ely eq ated by a si gle angl o a ngl line

[2] This often happens when the warm and cold points, or the round and pointed ones are applied to the skin within the limits of a single *Empfindungskreis*

when we pass from one point to another in the back so much faster on the tongue and finger tips but with such inconceivable rapidity on the retina what are they? Can we discover anything about their intrinsic nature?

The most natural and immediate answer to make is that they are unlikeness of *place* pure and simple In the words of a German physiologist to whom psy h

quality is nothing like an external a c f culty but must be egarded as something imm nently residing in the sensation tself

And yet the moment we reflect on this answer an insuperable lo cal difficulty seems to present tself No single *quale* of sensation can by itself amount to a consciou ness of *pos t on* Suppose no feelin but that of a single point ever to be awakened Could that possibly be *the eness?* Certainly not *Only when one acqu e a determi ation of up do c e all elati e to that second po nt* Each po nt so far as it is *placed* is then only by rtue of what it *is not* namely by irtue of another point This is as m ch as to say that pos tion has nothing nt ins c about it and that although a feeling of absolute bigness may *a feel ng of place can not possibly form an im manc t element in any s gle isolated sensation* The very writer we have quoted has given heed to this objection for he continues (p) by savin that the s m ll local ed are only so *in themsel es* but not in the rep-

co d u ns became ... b l t t elf before it has borne its ulterior fruits in the developed consciousness?

Local Signs

To begin w th e ery sensat on of the skin and every visceral sensation seems t d ri e f om ts topographic seat a peculiar shade of feelin which it vould n t ha e n nothe place And this feelin *per se* seems quite another thing from the pe c pt on of the place Says Wundt

> If th the f w t h fi t the ch k d then the palm e rt g each time p th m p s e th ensat o h w twithstandi g di tinctly mark d d I en h t ses S m l l hen e c mpa e th palm w th the b ck f th hand the nape f th k with its anterio urfa e, the breast w th the ba k in h it any two distant parts f the skin w th each othe And moreover

Verordt *G undris de Phy l gie* 5th d (877) pp 3 6 436

b V k The le (Le pzi 863) p 4 See ls Ladd *Ph ol g al P y h logy* pp 396–98 and mpare the co t by G Stanley Hall (in *M d* p) f th se sa ns p od ed b m bl t point l ghtly th kin Po f cut g pain qui ring th illing hirh g ticklin scratching and ccelerati alt nated th ch th along th rf e.

we easily remark by attentively observing that spots even tolerably close together differ in respect of the quality of their feeling If we pass from one point of our cutaneous surface to another we find a perfectly gradual and continuous altera ion in our feeling notwithstanding the objective nature of the contact has remained the same Even the sensations of corresponding points on opposite sides of the body though similar are not identical If for instance we touch first the back of one hand and then of the other we remark a qualitative unlikeness of sensation It must not be thought that such differences are mere matters of imagination and that we take the sensations to be different because we represent each of them to ourselves as occupying a different place With sufficient sharpening of the attention we may confinn ourselves to the quality of the feelings alone entirely abstract from their locality and yet notice the differences quite as markedly

Whether these local contrasts shade into each other with absolutely continu ous gradations we cannot say But we know (continues Wundt) that

they change when we pass from one point of the skin to its neighbor with very dif ferent degrees of rapidity On delicately feeling parts used principally for touching such as the finger tips the difference of sensation between two closely approximate points is already strongly pronounced whilst in parts of lesser delicacy as the arm the back the legs the disparities of sensation are observable only between distant pots

The internal organs too have their specific *qualia* of sensation An inflam mation of the kidney is different from one of the liver pains in joints and mus cular insertions are distinguished Pain in the dental nerves is wholly unlike the pain of a burn But very important and curious similarities prevail through out these differences Internal pains whose seat we cannot see and have no means of knowing unless the character of the pain itself reveal it are felt *where* they belong Diseases of the stomach kidney liver rectum prostate etc of the bones of the brain and its membranes are referred to their proper position Nerve pains describe the length of the nerve Such localizations as those of ver tical frontal or occipital headache of intra cranial origin force us to conclude that parts which are neighbors whether inner or outer may possess by mere virtue of that fact a common peculiarity of feeling a respect in which their sensations agree and which serves as a token of their proximity These *local* colorings are moreover so strong that we cognize them as the same throughout all contrasts of sensible quality in the accompanying perception Cold and heat are wide as the poles asunder yet if both fall on the cheek there mixes with them something that makes them in *that respect* identical just as contrari wise despite the identity of cold with itself wherever found when we get it first on the palm and then on the cheek some difference comes which keeps the two experiences forever asunder [1]

[1] Of the an tom cal a d physiological cond tions of these facts we know as yet but little and that l ttle need not here be discussed Tw principal hypotheses have been invoked in the case of the ret na Wu dt (*Me chen u d Th e e le* 1 p 214) called att ntion to the changes of color s nsibil ty wh ch the retina displays as the image of the col red object passes from the fo ea to the periphery The c lor alters and becomes darker and the cha ge is m
of v
moc
color but as distinctions in its local ty Lotze (*M d usck Psych l g e* pp 333 355) on

And now let us revert to the query propounded a moment since *Can these d fferences of mere quality in feeling varying according to locality yet ha ing each sensibly and intrinsically and by itself notl ing to do with position consti tute the susceptibilities we mentioned the conditions of being perceived in pos tion of the localities to which they belong?* The numbers on a row of houses the initial letters of a set of words have no intrinsic kinship with points of pace and yet they are the conditions of our knowledge of where any house is in the row or any word in the dictionary Can the modifications of feeling in question be tags or labels of this k wi originally reveal the position of the spot to which they are a a customary tie ? M tive *Lot* e who in his in this way designating them thus conceived as *local signs* This term has ob ta ned wide currency in Germany and *in speaking of the* LOCAL SIGN THEORY *he eafter I shall always mean the theory which denies that there can be in a sensation any element of actual locality of inherent spatial order* any tone as it were which cries to us immediately and without further ado I am *here* or I am *there*

If as may well be the case we by this time find ourselves tempted to accept the Local sign theory in a general way we have to clear up several farther mat ters If a sign is to lead us to *the th ng* it means we must have some other source of knowled e of that thing Either the thing has been given in a previous experi ence of which the sign also formed part—they are *associated* or it is what Reid calls a natural sign that is a feeling which the first time it enters the mind evokes f om the native powers thereof a cognition of the thing that hitherto had lain dormant. In both cases however the s gn is one thing and the thin an ther In the instance that now concerns us *the sign is a quality of feeling and the th ng s a pos tion* Now we have seen that the position of a point is not only revealed but created by the existence of other points to which it stands in de- t rm nat elat ons *If the sign can by any machinery which it sets in motion*

than the law of hab t in the nervous system When any point of the sensitive surface has been frequently excited simultaneously with or immediately before afte other points and afterwards comes to be excited alone there will be a tendency for its perceptive nerve-centre to irradiate into the nerve-centres of

h the hand has pointed t th peculiar t nd cy which ch particular po t f the re na has t call f rth that m ment f th y ball which will carry th imag f th cit ing bject from the point q estu t the f ea. W th ch sepa t te dency to m vem t (as th ch ct l m ment) w may suppose pec liar m dificati of sensibility t be j d This modificatio w ld constit te th peculi local tingeing f th image by ch point See also S lly *P ych l gy* pp 8- Prof B E dma has quit lately (*V ter lj h sschrift f wiss Phil* x, pp. 3 4 9) denied th exist ce f all evidence f such imm *qualia* f feeling charact rizing ch locality A te as his remarks are, they quit f il vin me On th skin th *qualia* ev dent, I sh ld say Wh as th retina they re less so (Kries nd Auerbach) this may ell be mere difficulty f discrimi natio t y t ed cated t th analysis.

85 p. 33

the other points Subjectively considered this is the same as if we said that *the peculiar feeling of the first point* SUGGESTS *the feeling of the entire region with whose stimulation its own excitement has been habitually* ASSOCIATED

Take the case of the stomach When the epigastrium is heavily pressed when certain muscles contract etc the stomach is squeezed and its peculiar local sign awakes in consciousness simultaneously with the local signs of the other squeezed parts There is also a sensation of total vastness aroused by the com bined irritation and *somewhere* in this the stomach feeling seems to be Sup pose that later a pain arises in the stomach from some non mechanical cause It will be tinged by the gastric local sign and the nerve-centre supporting this lat ter feeling will excite the centre supporting the dermal and muscular feelin s habitually associated with it when the excitement was mechanical From the combination the same peculiar vastness will again arise In a word something in the stomach sensation reminds us of a total space of which the diaphra matic and epigastric sensations also form a part or to express it more briefly still suggests the neighborhood of these latter organs [1]

Revert to the case of two excited points on a surface with an unexcited space between them The general result of previous experience has been that when either point was impressed by an outward object the same object also touched the immediately neighboring parts Each point together with its local sign is thus associated with a circle of surrounding points the association fading in strength as the circle grows larger Each will revive its own circle but when both are excited together the strongest revival will be that due to the *com bined* irradiation Now the tract *joining the two excited points* is the only part common to the two circles And the feelings of this whole tract will therefore awaken with considerable vividness in the imagination when its extremities are touched by an outward irritant The mind receives with the impression of the two distinct points the vague idea of a line The twoness of the points comes from the contrast of their local signs the line comes from the associations into which experience has wrought these latter If no ideal line arises we have duality without sense of interval if the line be excited actually rather than ideally we have the interval given with its ends in the form of a single extended object felt E H Weber in the famous article in which he laid the foundations of all our accurate knowledge of these subjects *laid it down as the logical requisite for the perception of two separated points that the mind should along with its consciousness of them become aware of an unexcited interval as such I ha e only tried to show how the known laws of experience may cause this requisite to be fulfilled* Of course if the local signs of the entire region offer but little qualitative contrast *inter se* the line suggested will be but dimly defined or dis

[1] May be the localization of intracranial pain i itself du to su h as ci tion as this of local s gns with each othe rather than to thei qual tativ s milarity in n ghb ring parts (*supra* p 464) though it is conceivable that ass ciation and s mila ty tself sh uld here have one and the same neural basis If w supp s the sens ry n es fr m th pa ts f the body beneath any patch of sk n to te m nat in th m ensonal b ain tr ct th se f m the skin itself and f the excit ment of any ne fib e t nds t i adiat through th whole of that t ct the feel ngs of all f b g ng to that t act w uld pr um ll l th has a similar intrinsic quality and at the same t me tend each to ar use th oth S n e the same nervetrunk in most cases suppl s the sk n and the pa ts beneath the nato ni al hypothesis presents noth ng improbable

criminate ... hle lines in its neighborhood
This is w
whilst only

The relation of position of t

Turn now to the simplest case
ts position? Not by recalling any particular line unless experience ... stantly been in the habit of m ... some one line from it towards some one neighboring point N ... ing habitually occurs The con ... whole neighboring circle i e *it happens to lie* By a process of successive construction it is quite tru ... we can also get the feeling of distance between the spot and some other particular pot Attention by reinforcing the local sign of one part of the circle can awaken a new circle round this part, and so *de proche en proche* we may slide our feeling down from our cheek, say to our foot. But when we first touched our cheek we had no consciousness of the foot at all [1] In the extremities the l ps the tongue and other mobile parts the case is different We there have an instinctive tendency when a part of lesser discriminative sensibility is touched to move the member so that the touching object glides along it to the place where sensibility is greatest If a body touches our hand we move the hand over it till the finger tips are able to explore it If the sole of our foot touches anything we bring it towards the toes and so forth There thus arise lines of hab tual passage from all points of a member to its sensitive tip These are the li es most read ly recalled when any point is touched and their recall is dentical w th the consciousness of the distance of the touched point from the t p I think anyone must be aware when he touches a point of his hand or wrist that it is the relation to the fin er tips of which he is usually most con sci s Points on the fo e arm suggest either the finger tips or the elbow (the latter being a spot of greater sensib lity) In the foot it is the toes and so on A point can only be cognized in ts relations to the entire body at once by awak en ng a v *sual* mage of the whole body Such awakening is even more obvi ously than the previously cons dered cases a matter of pure association

This leads us to the eye On the retina the fovea and the yellow pot about it form a focus of exquisite sens bility towards which every impress on falling on an outlying portion of the field is moved by an instinctive action of the muscles of the eyeball Few persons until their attention is called to the fact are aware how almost impossible it is to keep a conspicuous visible object in the margin of the field of v ew The moment volition is relaxed we find that

[1] l s indeed th f t h ppen t be p tan ly tingh g som thi g f th t t th m m t. Th wh l f f th b dy is alw y in tate f semi nsci us ... h ch eds nly th mphasis f tt t f som cid tal inward r ta tio t be m tr g t y po t.

It is tru that th nsid f th f rm th gh ts discrimin t sensibility is ften indulged in when th back f th f e-arm feels an b j ct gainst it.

without our knowing it our eyes have turned so as to bring it to the centre This is why most persons are unable to keep the eyes steadily converged upon a point in space with nothing in it The objects against the walls of the room invincibly attract the foveæ to themselves If we contemplate a blank wall or sheet of paper we always observe in a moment that we are directly looking at some speck upon it which unnoticed at first ended by catching our eye Thus *whenever an image falling on the point P of the retina excites attention it more habitually moves from that point towards the fovea than in any one other direction* The line traced thus by the image is not always a straight line When the direction of the point from the fovea is neither vertical nor horizontal but oblique the line traced is often a curve with its concavity directed upwards if the direction is upwards downwards if the direction is downwards This may be verified by anyone who will take the trouble to make a simple experiment with a luminous body like a candle flame in a dark enclosure or a star Gazing first at some point remote from the source of light let the eye be suddenly turned full upon the latter The luminous image will necessarily fall in succession upon a continuous series of points reaching from the one first affected to the fovea But by virtue of the slowness with which retinal excitements die away the entire series of points will for an instant be visible as an after image displaying the above peculiarity of form according to its situation These radiating lines are neither regular nor invariable in the same person nor probably equally curved in different individuals We are incessantly drawing them between the fovea and every point of the field of view Objects remain in their peripheral indistinctness only so long as they are unnoticed The moment we attend to them they grow distinct through one of these motions—which leads to the idea prevalent among uninstructed persons that we see distinctly all parts of the field of view at once *The result of this incessant tracing of radii is that whenever a local sign P is awakened by a spot of light falling upon it it recalls forthwith even though the eyeball be unmoved the local signs of all the other points which lie between P and the fovea* It recalls them in imaginary form just as the normal reflex movement would recall them in vivid form and with their recall is given a consciousness more or less faint of the whole line on which they lie In other words no ray of light can fall on any retinal spot without the local sign of that spot revealing to us by recalling the line of its most habitual associates its direction and distance from the centre of the field The fovea acts thus as the origin of a system of polar co-ordinates in relation to which each and every retinal point has through an incessantly repeated process of association its distance and direction determined Were P alone illumined and all the rest of the field dark we should still even with motionless eyes know whether P lay high or low right or left through the *ideal streak* different from all other streaks which P alone has the power of awakening[2]

[1] These facts were first noticed by Wundt see his *Beiträge* pp 140 202 See also Lamansky in *Pflüger's Archiv* XI p 418

[2] So far all has been plain sailing but our course begins to be obstructed as we descend into minuter detail that I will treat of the more precise determination of locality in a long note When P recalls an ideal line leading to the fovea that line is felt but obscurely and but vaguely whilst P which we supposed to be a single spot of actual light stands out in strong distinction from it The ground of the distinction between P and the ideal line which it terminates is manifest—P being vivid while the line is faint *but why should P*

And with this we can close the first great division of our subject. We have shown that, within the range of every sense experience takes *ab initio* the spatial form We ha h ces of the retina and skin every sensible total may b which are also spaces spaces too Furthermore we have seen (in a footnote) that different ... once discriminated necessarily fall into a determinate order both by reason of

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h ld th particular p si on t doe at the end f the lin ather tha ywher ls —for sample in it middle? That seems som thin t t all manifest.

T clear p ur th ughts bo t this latt mystery l t us tak the case f an ctual line f light, f wh se parts isideal. The eeling f the lin is prod ced as w kn w wh n mulut de f retinal points ar excited t eth ach f which wh excit d par t ly would gi e rise t *one* f th feelings called local signs. Each f these signs is th feelin f small pace. From their simultaneous arousal w might well suppose feeling f larg space t result. B t why is it necessary that in this larger space usness the sign sh uld r th th and *m* in th middl ? F r th h th

h
fi

be located within any m ...
comb t th l th points an becom sev rally afi agan th separat puffs f

so diff ent result? In f ct, he will se sort f logical connectio between ( ) th orig nal separate local signs, ( ) th lin as unit (3) th Lin with th points discriminated in it, and (4) the various erve processes which bserv all these different things H will u pect ur local gn f being very slippery and mbiru us sort f creature P ti nl ss t first, it soone ppears in th midst f gang f mpani ns than t is f und maintain ing th strictest positio f its wn, and assigning place to each f its associates. H w is this possible? Must ccept what w rejected whil ag as bsurd, and admit th points each t ha e position *in* ? Or must w u pect that *our* wh le nstructio has been falla cious, and that w ha tried t onjur up, t f associati qualities which th associates nev co tained?

Ther no d bt real diffi ulty here and th h rtest way f dealing with t w uld be t co fess it insoluble and ultimate. Even if position be t an intrinsic character f any ne f those sensations we have called local signs, we must till admit that th re is *methi g* about ev ry f them that stands f th potentiality f positi n, and is th gr *nd* why th local sign, h t g s placed t all, gets placed *here* rath than *there* If this some thing be int rpreted as physi logical something as mere nerve process, it is easy t say in black way that when t is excited alone, it is an "ultimate f ct ( ) that positionless po ll ppear that wh t is exci ed t geth w th th similar processes, b t with t th p ocess f discriminati ttentio t is anoth "ultimat fact ( ) th t unitary lin will me and that the final ultimate f ct (3) is that whe th nerve process is excited in ... that th process which ubserves th feeling f ttenti n, what results will be the line with th local si inside f t determined t particula place. Thus w would escape th responsibility of explaining, by falling back the everlasting inscruta bility f the psycho-neural ... The moment we call th ground f localizati physio l ical, w need nly poi t t how in th se cases which localizati occurs, the physio logical process di er f m those in t which it does t, t ha e do all w can possibly

definite gradations in their quality and by reason of the fixed order of time-succession in which movements arouse them But in all this nothing has been said of the comparative *measurement* of one sensible space total against another or of the way in which by summing our divers simple sensible space-experiences together we end by constructing what we regard as the unitary continuous and infinite objective Space of the real world To this more difficult inquiry we next pass

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do in the matter This would be *unexceptionable logic and with it we might let the matter* drop satisfied that there was no self contrad tion in it but only the universal psychological puzzle of how a new mode of consciousness emerges whenever a fundamentally *new* mode of nervous action occurs

But blameless as such tactics would log cally be on our part let us see whether we cannot push our theoretic insight a little farther It seems to me we can We cannot it is true give a reason why the line we feel when process (2) awakens should have its own pecul ar shape nor can we explain the essence of the process of discrim native attention But we can see why if the brute facts be admitted that a line may have one of its parts singled out by *attention at all* and that that part may appear in relation to other parts at *all* the relation must be *in the l ne itself*—for the l ne and the parts are the only things supposed to be in *consciousness* And we can *furthermore suggest* a reason *why parts appearing thus in* relation to each other in a l ne should fall into an immutable order and each within that order keep its characteristic place

If a lot of such local signs all have any quality which evenly augments as we pass from one to the other we can arrange them in an ideal serial order in which any one local sign must l e below those with more above those with less of the quality in question It must divide the series into two parts—unless indeed it have a maximum or minimum of the quality when it either begins or ends it

Such an ideal ser es of local signs in the m nd is however not yet identical with the feeling of a line in space Touch a dozen points on the skin *s ccess v ly* and there s ems no necessary reason why the notion of a definite line should emerge even though we be strongly aware *of a gradation of quality among the touches We may of cou se symbolically ar ange* them in a line in our thought but we can always distinguish betv een a line symbolically *thought and a l ne directly felt*

But note now the pecul arity of the nerve processes of all these local s gns though they may give no line when excited success vely when excited *tog th r* they do give the actual sensation of a line in space The sum of them is the neural process of that line the sum of their feelings is the feeling of that line and if we begin to s ngle out particular points from the line and notice them by their rank it is imposs ble to see how this rank can *appear* except as an actual fixed space position sensibly felt as a b t of the total lin The scal itself appearing as a line rank in it must appear as a definite part of the line If the seven notes of an octave when hea d together appea ed to th sense of hearing as an outsp ead *l* of sound—wh ch it is needless to say they do not—why then no one note could be discriminat d without b ng localized accord ng to its pitch *in* the line either as one of its extremities or as *some part between*

But not alone the g adation of thei quality arranges the l cal gn fe l ngs n a scal Ou *mov m nts* arrange them also in a *t m* scale Wheneve a stimulus passes from point of the sk n or retina to point *f* it awakens the l cal sign feel ng in th p f ctly defin te time ord *abcd f* It ann t xc te *f* unt l *d* hav b en u c ss v lv a us d Th f ling sometimes is preceded by *ab* sometimes followed by *b* according to the mo ment s directi n the result of it all being that we never feel ither *a c* or *f* w th ut th ling ng to it faint *reverberations of the various time-orders of trans t n in whi h throughout pa t experience* it has b en aroused T the local gn *a* th e clings th t ng r tone the penumb a r *fringe of the t ansition b d* To *f* to *c* there l ng quite d ff ent t nes One admit the principle that a feeling may be ting d by the reproductive consciousness of an habitual transition even when the tran it n is not m d and it s ms nt lv natu l t admit th t if the transition be habitually in the rder *b d f* an l if and *f* be f lt separat ly at all *a* will be felt with an essential *earlin ss f* with an ssential *lat ness* and that *c* will fall between Thus those psychologists who set l ttl to e by lo al gns and great store by m ve

The Construction of Real Space

h d nate problems

2 *How do their mutual addition and jus*
in a word how does their synthesis occur?

I think that as in the investigation just finished we found ourselves able to get along without invoking any data but those that pure sensibility on the
d n tellectual powers of discrimination and recollection

the supposition that no other mental forces have been
find everywhere else in psychology sensibility namely for the data and discrim nation association memory and choice for the rearran ements and com binations which they undergo

1 *The S bd is on of the Original Sense spaces*

H w are spatial subdivis ons brought to consciousness? In other words how

and in touch than in hearing smell or taste.

The fi st g eat co d tion s that different po ts of the surface shall d ffer in the quality of their mma ent sensibility that is that each shall carry its special local-sign If the skin felt everywhere exactly alike a foot bath could be dist nguished from a total immersion as being smaller but never distinguished from a wet face The local signs are indispensable two points which have the *same local sign will always be felt as the same point We do not jud e them* two unless we ha e discerned their sensations to be different Granted none but homogeneous irritants that organ would then distinguish the greatest multiplic ity of irritants—would count most stars or compass po nts or best compare the s ze of two wet surfaces—whose local sens bility was the least even A skin

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ments in explaining pa percepti w uld have pe fectly definit tim -o d d t moti by which t count f th d finit rd f po ti ns th t ppears when sensiti e spots ar excited all at onc W th t h w the preliminary admissio f the ultimate fact that this lecti cit ment shall feel like *line* and thing lse t can b explai d why th new d sh ld needs b an rd f *p ti ons* and t f mer ly deal serial ra k W shall h eaft ha any m unt f pportunity t bserv h w th gh going is th participati f m ti m all ur sp tial m as em ts Wh th the local signs ha e their respecti qualities nly grad ted t th f lings f transiti must be se d wn as m ng th *era causa* in localizati n. B t th gradati f th local signs is hardly t be d bted so w may believ rsel es really t possess tw sets f reasons f r localizing any point w may happen t distinguish f m t th midst f any lin any larger pace

M B net (in *Revue philo phique* Sept 880 p 9) says w j dg th m locally diff en as soo their sensati ns diff eno gh f us t distingu h them as q alitatively dif f rent hen uccessively excited This is t strictly tru Skin se sati ns, diff t no gh to be discriminated when ucc ssr may till fuse locally if excited both t ce

whose sensibility shaded rapidly off from a focus like the apex of a boil would be better than a homogeneous integument for spatial perception The retina with its exquisitely sensitive fovea has this peculiarity and undoubtedly owes to it a great part of the minuteness with which we are able to subdivide the total bigness of the sensation it yields On its periphery the local differences do not shade off very rapidly and we can count there fewer subdivisions

But these local differences of feeling so long as the surface is unexcited from without are almost null I cannot feel them by a pure mental act of attention unless they belong to quite distinct parts of the body as the nose and the lip the fingertip and the ear their contrast needs the reinforcement of outward excitement to be felt In the spatial muchness of a colic—or to call it by the more spacious sounding vernacular of a bellyache —one can with difficulty distinguish the north east from the south west corner but can do so much more easily if by pressing one s finger against the former region one is able to make the pain there more intense

The local differences require then an adventitious sensation superinduced upon them to awaken the attention After the attention has once been awakened in this way it may continue to be conscious of the unaided difference just as a sail on the horizon may be too faint for us to notice until someone s finger placed against the spot has pointed it out to us but may then remain visible after the finger has been withdrawn But all this is true only on condition that separate points of the surface may be *exclusively* stimulated If the whole surface at once be excited from without and homogeneously as for example by immersing the body in salt water local discrimination is not furthered The local signs it is true all awaken at once but in such multitude that no one of them with its specific quality stands out in contrast with the rest If however a single extremity be immersed the contrast between the wet and dry parts is strong and at the surface of the water especially the local signs attract the attention giving the feeling of a ring surrounding the member Similarly two or *three wet spots separated by dry spots or two or three hard points against the* skin will help to break up our consciousness of the latter s bigness In cases of this sort where points receiving an identical kind of excitement are nevertheless felt to be locally distinct and the objective irritants are also judged multiple —e g compass points on skin or stars on retina —the ordinary explanation is no doubt just and we judge the outward causes to be multiple because we have discerned the local feelings of their sensations to be different

Capacity for partial stimulation is thus the second condition favoring discrimination A sensitive surface which has to be excited in all its parts at once can yield nothing but a sense of undivided largeness This appears to be the case with the olfactory and to all intents and purposes with the gustatory surfaces Of many tastes and flavors even simultaneously presented each affects the totality of its respective organ each appears with the whole vastness given by that organ and appears interpenetrated by the rest [1]

[1] It may howe[illegible] be said that even in the tongu[illegible] the[illegible] a d[illegible] termin[illegible]t on of b[illegible]tt[illegible] flav[illegible]rs to the back and of acids to the f[illegible]ont edg[illegible] [illegible]f th[illegible] o[illegible]gan Sp[illegible]ces l[illegible]ke[illegible]ise aff[illegible]t its sides and front as a taste l[illegible]ke that [illegible]f alum l[illegible]cal[illegible]z[illegible]s its[illegible]lf by [illegible]t[illegible] styptic [illegible]ff[illegible]ct [illegible]n th[illegible] p[illegible]t[illegible]n [illegible]f m[illegible]cous membrane wh[illegible]ch it immediately tou[illegible]h[illegible]s m[illegible] [illegible]h[illegible]ply than [illegible]oast po[illegible]k f[illegible] [illegible]e[illegible]mple which stimulates all part[illegible] alike Th[illegible] p[illegible] [illegible] th[illegible] [illegible] [illegible] [illegible] m[illegible] [illegible]pac[illegible]us th[illegible]an th[illegible] [illegible]lum [illegible] the pepper In the nose too ce[illegible]tain smells of wh[illegible]h [illegible] [illegible]g[illegible]r may be t[illegible]k[illegible]n as th[illegible] type seem

I should have been willing some years ago to name without hesitation a third condition of discrimination—saying it would be most developed in that organ which is susceptible of the *most various qualities* of feeling The retina is un questionably such an organ. The colors and shades it perceives are infinitely more numerous than the diversities of skin sensation And it can feel at once white and black, whilst the ear can in nowise so feel sound and silence But the late researches of Donaldson Blix and Goldscheider on specific points for heat cold pressure, and pain in the skin the older ones of Czermak (re- [illegible] laboratory) showing that a hot and a cold
peat[illegible]
com[illegible]
pera[illegible]
make [illegible]

k[illegible]
b[illegible]
I[illegible]

The onl real objection t the law f partial stimula on [illegible]
hat might be drawn fr m the rgan f hearing f ccording t modern theories, th cochlea ma have ts separate erve-termini exclusively excited by sounds f differing pitch, and t th sounds seem all t fill comm space, and ot necessarily to be arranged along side f each the At most th high note is felt as thinner brighter streak against darker background. In an article pace, published in th *Journal f Speculative Phil phy* for January 8 9, I vent red to ggest that possibl th dit ry nerv t rmini might be cited all t nce by sounds f any pitch, as the wh l retina w uld be by every lumin us poin if there were di ptric apparatus affixed. And I added Notwithstanding the [illegible] [illegible] of the l st few years which assign different cou tic end-organs to dif [illegible]

Donaldson, in *Mind* x, pp. 399, 5 Goldscheider in *A* *hiv f (Ana*) *Physiologie* Blix in *Zeitschr* *fur Biologie* A good résumé may be f und in Ladd *Physiol P ychology* part ii chap iv §§ t

I tried nine or ten people, making umerous observations on each, what difference it made in the discrimination of two points t have them alike unlike. The points ch sen wer large needle heads, ( ) w screw heads, and (3) needle head and screw h d The distanc f the screw heads was measured from their centres. I f und that when the points ga diverse qualities f feeling (as in 3) this facilitated th discriminati n, b t much less strongly than I expected. The difference, in fact, would ften not be perceptible [illegible] times running. When, h wever ne f the points was endowed with rotary mo e me he other remaining still, the doubleness f th points became much more evident than bef T bserv this I took an ordinary pair f compasses with one point blunt, and the mo ab leg replaced by metallic rod hich could, at any moment, be made t rotate on su h dentist drilling machine, to hich it was attached. The compass had then its points applied the skin at such distance part as to be f t as ne impression. Suddenly [illegible] the drill [illegible] pair [illegible] then almost al) make them seem as two.

which is particularly exciting, and that is the *feeling of motion over any of our surfaces*. The erection of this into a separate elementary quality of sensibility is one of the most recent of psychological achievements, and is worthy of detaining us a while at this point.

The Sensation of Motion over Surfaces

The feeling of motion has generally been assumed by physiologists to be impossible until the positions of *terminus a quo* and *terminus ad quem* are severally cognized, and the successive occupancies of these positions by the moving body are perceived to be separated by a distinct interval of time.[1] As a matter of fact, however, we cognize only the very slowest motions in this way. Seeing the hand of a clock at XII and afterwards at VI, we judge that it has moved through the interval. Seeing the sun now in the east and again in the west, I infer it to have passed over my head. But we can only *infer* that which we already generically know in some more direct fashion, and it is experimentally certain that we have the feeling of motion given us as a direct and simple *sensation*. Czermak long ago pointed out the difference between seeing the motion of the second hand of a watch, when we look directly at it, and noticing the fact of its having altered its position when we fix our gaze upon some other point of the dial-plate. In the first case we have a specific quality of sensation which is absent in the second. If the reader will find a portion of his skin—the arm, for example—where a pair of compass-points an inch apart are felt as one impression, and if he will then trace lines a tenth of an inch long on that spot with a pencil-point, he will be distinctly aware of the point's motion and vaguely aware of the direction of the motion. The perception of the motion here is certainly not derived from a pre-existing knowledge that its starting and ending points are separate positions in space, because positions in space ten times wider apart fail to be discriminated as such when excited by the dividers. It is the same with the retina. One's fingers when cast upon its peripheral portions cannot be counted—that is to say, the five retinal tracts which they occupy are not distinctly apprehended by the mind as five separate positions in space—and yet the slightest *movement* of the fingers is most vividly perceived as movement and nothing else. It is thus certain that our sense of movement, being so much more delicate than our sense of position, cannot possibly be derived from it. A curious observation by Exner[2] completes the proof that movement is a primitive form of sensibility, by showing it to be much more delicate than our sense of succession in time. This very able physiologist caused two electric sparks to appear in rapid succession, one beside the other. The observer had to state whether the right-hand one or the left-hand one appeared first. When the interval was reduced to as short a time as 0.044", the discrimination of temporal order in the sparks became impossible. But Exner found that if the sparks were brought so close together in space that their irradiation-circles overlapped, the eye then felt their flashing as if it were the motion of a single spark from the

[1] This is only another example of what I call the 'psychologist's fallacy'—thinking that the mind he is studying must necessarily be conscious of the object after the fashion in which the psychologist himself is conscious of it.

[2] *Sitzb. der k. Akad.* (Wien, 1875), vol. LXXII, pt. 3.

point occupied by the first to the point occupied by the second and the time-interval might then be made as small as 0.015 before the mind began to be in doubt as to whether the apparent motion started from the right or from the left On the skin similar experiments gave similar results

Vierordt at almost the same time called attention to certain persistent illusions amongst which are these If another person gently trace a line across our wrist or finger the latter being stationary it will feel to us as if the member were moving in the opposite direction to the tracing point If on the contrary we move our limb across a fixed point it will be seen as if the point were moving as well If the reader will touch his forehead with his forefinger kept motionless, and then rotate the head so that the skin of the forehead passes beneath the finger's tip he will have an irresistible sensation *of the latter being* itself in motion in the opposite direction to the head So in abducting the fingers from each other some may move and the rest be still but the still ones will feel as if they were actively separating from the rest These illusions according to Vierordt, are survivals of a primitive form of perception when motion was felt as such but ascribed to the whole content of consciousness and not yet distinguished as belonging exclusively to one of its parts When our perception is fully developed we go beyond the mere relative motion of thing and ground and can ascribe absolute motion to one of these components of our total object and absolute rest to another When in vision for example the whole background moves together we think that it is ourselves or our eyes which are moving and any object in the foreground which may move relatively to the background is judged by us to be still But primitively this discrimination cannot be perfectly made. The sensation of the motion spreads over all that we see and infects it Any relative motion of object and retina both makes the object seem to move and makes us feel ourselves in motion Even now the moon We *know* the moon is still but we *see* it move even faster than the clouds Even when we slowly move our eyes the primitive sensation persists under the [illegible] conception If we notice closely the experience we find that any object towards which we look appears moving to meet our eye.

But the most valuable contribution to the subject is the paper of G H Schneider who takes up the matter zoologically and shows by examples from every branch of the animal kingdom that movement is the quality by which animals most easily attract each other's attention The instinct of shamming death is no shamming of death at all but rather a paralysis through fear which saves the insect crustacean or other creature from being *noticed at all* by his enemy It is parallelled in the human race by the breath holding stillness of the boy playing I spy to whom the seeker is near and its obverse side is shown in our involuntary waving of arms jumping up and down and so forth when we wish to attract someone's attention at a distance Creatures stalking

Zeitschrift fur Biologie xii, p 6 (186)
Vierteljahrsch. fur wiss Philos., ii, p 3 7

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it seems to have become so th ough ... whatever object may touch th... possess of twitching and moving it under whatever object may touch ... as to become better acquainted with the conformation of the same Czermak was the first to notice this It may be easily verified Of course *movement of surface under object is (for purposes of stimulation) equivalent to movement of object over surface* In exploring the shapes and sizes of things by either eye or skin the movements of these organs are incessant and unrestrainable Every such movement draws the points and lines of the object across the surface imprints them a hundred t... d d ... es them home to the attention The immense part ... held by many psychologists ... h the muscular sense ...

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face sens bilities into play and that t ... (quite apart from any question of measuring the space between them) largely depends on the mobil ty of the surface upon which they fall

2 *The Measurement of the Sense spaces against Each Other*

What precedes is all we can say in answer to the problem of discrimination Tu n now to that of measurement of the several spaces against each other that being the first step in our constructing out of our diverse space experiences the one space we believe in as that of the real world

The first thing that seems evident is that we have no *immediate* power of comparing together with any accuracy the extents revealed by different sensa

th sz d sh pe f bj ct by imply laying his h d flat po wi nn ... great bstacle is that h *f is the* t so mperfectly Th m m t h w th h d mo th co t ar emph tically and distin tly f lt. All pe eptu f shap and siz is pe eptu f t urs, d first f all these must b made *k p* M t d es this d th mpulse m ur ga in pe pti is primarily d to th cra g which w feel t ge ur f sensations sh rp When t m t th naming and meas ring f bj cts in rms f som mm ta dard w shall see p sc tly h w m ments h lp also b t m in this case than the b do th y help because th q ality f extensi n tself is co trib ed by the muscular sense.

their prey and creatures hiding from their pursuers alike show how immobility diminishes conspicuity In the woods, if we are quiet the squirrels and birds will actually touch us Flies will light on stuffed birds and stationary frogs[1] On the other hand, the tremendous shock of feeling the thing we are sitting on begin to move the exaggerated start it gives us to have an insect unexpectedly pass over our skin or a cat noiselessly come and snuffle about our hand the excessive reflex effects of tickling etc , show how exciting the sensation of motion is *per se* A kitten cannot help pursuing a moving ball Impressions too faint to be cognized at all are immediately felt if they move A fly sitting is unnoticed — we feel it the moment it crawls A shadow may be too faint to be perceived As soon as it moves however, we see it Schneider found that a shadow with dis tinct outline and directly fixated could still be perceived when moving al

presence The moment we move it to and fro however we discern it Such *visual perception as this reproduces the conditions of sight among the radiates*[2]

Enough has now been said to show that *in the education of spatial discrimi nation the motions of impressions across sensory surfaces must have been the principal agent* in breaking up our consciousness of the surfaces into a con sciousness of their parts Even to day the main function of the peripheral re gions of our retina is that of sentinels which when beams of light move over them cry *Who goes there?* and call the fovea to the pot Most parts of the

[1] Exner tries to show that the structure of the faceted eye of articultes adapts it for per ceiv ng motion lmo t clusi ely

[2] Schne der t
pression move
successive thai
on the retina
must be to produce the most perfect



Fig 53

In the left hand figure let the da k spot B move for example from right to left At the outset th re s the simultan ous contrast of black and wl ite in B and A When the m tion has occurred so that the ri ht hand figure is pr duc d the same co trast remains the black a d the white having ch nged places But in add t on to it there is a double succes ive c n trast first in A which a moment a o white has now become black and second in B which a moment a o bl ck has n w b c me white If we m ke each single f el n f contrast=1 (a suppos tion far too fav rable to the state of rest) the sum of c nt sts in the case of motion will be 3 as g nst 1 in the state of r st That is our attention will f e call d by a treble force to the difference f color p o ded the color begin to move—(*Cf* also Fl ischl Physi logische Optusche N ti n in pt 2 *S tz d k Akad* Vienna 1882)

skin of the most movable parts (the labors of Vierordt and his pupils have well shown this) and that in the blind whose skin is exceptionally discriminative it seems to have become so through the inveterate habit which most of them possess of twitching and moving it under whatever object may touch them so as to become better acquainted with the conformation of the same Czermak was the first to notice this It may be easily verified Of course *mo ement of sur face under object is (for purposes of stimulation) equivalent to movement of object o er surface* In exploring the shapes and sizes of things by either eye or skin the movements of these organs are incessant and unrestrainable Every such movement draws the points and lines of the object across the surface im prints them a hundred times more sharply and drives them home to the atten tion The immense part thus played by movements in our perceptive activity is held by many psychologists[1] to prove that the muscles are themselves the space- ... b lity but the muscular sense ... is for these

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[1] B ... M Ch ... *Revue phil* ... t t by ri ... w y which ...

[2] ... bo blind book wh se dimensi ns unk wn t him b will begin by esting t ainst his best so as t h ld t h rizo tal then, bringing his tw hands to ther t th middl f th edge pposi t th one gainst his body h will draw th m asunder till they each the ds f h edg q estio and th d t till then will h be bl t say what th length f h bject is (l xxv p 48) I think th t any ne wh will try t pp eci te the and shape f bject by simply "laying his hand fl t po t will find th t th great bstacle is that h *f ls th cont ur* so imperfectly Th m me t h wever th hands mo e th rs ar emphatically and distinctly felt All percepti f shape and size is pe ceptio f on rs, and first f all these must be made *harp* M ti does this and th mpulse to m ur organs in perc ptio is primarily d t th cra ing which w feel t ge ur surface-sensations sh rp When t mes t th naming and meas rin f bj ts in rms f some mmo tandard w shall see prese tly h w m ments help also b t mo in this case than the th so they help, because the quality f extensi itself is con trib ed by the "muscular sense.

tions Our mouth cavity feels indeed to itself smaller and to the tongue larger than it feels to the finger or eye our tympanic membrane feels larger than our finger tip our lips feel larger than a surface equal to them on our thigh So much comparison is immediate but it is vague and for anything exact we must resort to other help

The great agent in comparing the extent felt by one sensory surface with that felt by another is superposition—superposition of one surface upon another and superposition of one outer thing upon many surfaces Thus are exact equivalencies and common measures introduced and the way prepared for numerical results

Could we not superpose one part of our skin upon another or one object on both parts we should hardly succeed in coming to that knowledge of our own form which we possess The original differences of bigness of our different parts would remain vaguely operative and we should have no certainty as to how much lip was equivalent to so much forehead how much finger to so much back

But with the power of exploring one part of the surface by another we get a direct perception of cutaneous equivalencies The primitive differences of bigness are overpowered when we feel by an immediate sensation that a certain length of thigh surface is in contact with the entire palm and fingers And when a motion of the opposite finger tips draws a line first along this same length of thigh and then along the whole of the hand in question we get a new manner of measurement less direct but confirming the equivalencies established by the first In these ways by superpositions of parts and by tracing lines on different parts by identical movements a person deprived of sight can soon learn to reduce all the dimensions of his body to a homogeneous scale By applying the same methods to objects of his own size or smaller he can with equal ease make himself acquainted with their extension stated in terms derived from his own bulk palms feet cubits spans paces fathoms (armspreads) etc In these reductions it is to be noticed that *when the resident sensations of largeness of two opposed surfaces conflict one of the sensations is chosen as the true standard and the other treated as illusory Thus an empty tooth socket is believed to be* really smaller than the finger tip which it will not admit although it may *feel* larger and in general it may be said that the hand as the almost exclusive organ of palpation gives its own magnitude to the other parts instead of having its size determined by them In general it is as Fechner says the extent felt by the more sensitive part to which the other extents are reduced [1]

But even though exploration of one surface by another were impossible we

[1] Fechner describes (*Psychophysik* I p 132) a method of equivalents for measuring the sensibility of the skin Two compasses are used one on the part A another on the part B of the surface The points on B must be adjusted so that their distance apart appears equal to that between the points on A With the place A constant the second pair of points must be varied a great deal for every change in the place B though for the same A and B the relation of the two compasses is remarkably constant and continues unaltered for months, provided but few experiments are made on each day If however we practise daily their difference grows less in accordance with the law given in the text.

from one place to another (*cf* above p 544) but the principle of simplifying as much as possible our world would soon drive us out of that assumption into the easier one that objects as a rule keep their sizes and that most of our sensations are affected by errors for which a constant allowance must be made

In the retina there is no reason to suppose that the bignesses of two impres- ... essions are primitively felt to stand

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lation of the object to the eye
the object by moving changes
image e en on the same retu
ascr bin no absolute import
moment we may rece ve So c
become that it is next to imposs

at different distances without making the experiment of superposition We can n t say beforehand how much of a distant house or tree our finger will cover The various answe s to the familiar question How large is the moon?—answers which vary from a cartwheel to a wafer—illustrate this most strikingly The hardest part of the training of a young draughtsman is his learnin to feel directly the retinal (i e prim tively sensible) magnitudes which the different objects i the field of v ew subtend To do this he must recover what Ruskin calls the nnocence of the eye —that is a sort of childish perception of stains of olor merely as such without consciousness of what they mean

W th the rest of us this innocence is lost *Out of all the visual magn tudes of each k ow object we have selected one as the* REAL *one to th nk of and de g ad d all the othe s to serve as its sig s* This real magn tude is determined by æsthetic and practical inte ests It is that which we get when the object is at the d tance most prop tious for exact visual discrimination of its details This is the distance at which we hold anything we are examining Farther than this we see t too small nearer too large And the larger and the smaller feelings vanish in the act of suggest ng this one their more important *meaning* As I look along the d n ng table I overlook the fact that the farther plates and glasses *feel* so much smaller than my own for *I k ow* that they are all equal s ze and the feeling of them wh ch is a present sensation is eclipsed in the glare of the knowledge wh h is a merely imagi ed one

If the consistencies of s ght spaces *nter se* can thus be reduced of course th e can be no d fficulty in equating sight spaces with spaces gi en to touch In

wh ch the sense f touch possesses for our lives As a rule things only benefit or harm us by coming into d rect contact w th our skin s ght is only a sort of an tic patory touch the latter is in Mr Spencer s phrase the mother tongue of thought and the handma d s *idiom* must be translated into the language of the mistress bef re it can speak clearly to the m nd

Prof Jastrow gi es as th result f his experime ts this general nclusi (*Am J urnal f P ychology* iii, p 53)) "Th *space pe ceptions f dispar te senses are th msel es dis*parat and hatever harm y there is amo gst them w ar warranted in regarding as the

Later on we shall see that the feelings excited in the joints when a limb moves are used as signs of the path traversed by the extremity But of this more anon As for the equating of sound smell and taste volumes with those yielded by the more discriminative senses they are too vague to need any remark It may be observed of pain however, that its size has to be reduced to that of the normal tactile size of the organ which is its seat A finger with a felon on it and the pulses of the arteries therein both feel larger than we believe they really are"

It will have been noticed in the account given that *when two sensorial space impressions believed to come from the same object differ then* THE ONE MOST INTERESTING *practically or æsthetically* IS JUDGED TO BE THE TRUE ONE This law of interest holds throughout—though a permanent interest like that of touch may resist a strong but fleeting one like that of pain as in the case just given of the felon

The Summation of the Sense spaces

Now for the next step in our construction of real space *How are the various sense spaces added together into a consolidated and unitary continuum?* For they are in man at all events incoherent at the start

Here again the first fact that appears is that *primitively our space experiences form a chaos out of which we have no immediate faculty for extricating them Objects of different sense organs experienced together do not in the first in*

before discrimination has done its finished work The most we can say is that all our space experiences together form an *objective total* and that this *objective total* is vast

Even now the space inside our mouth which is so intimately known and accurately measured by its inhabitant the tongue can hardly be said to have its internal directions and dimensions known in any exact relation to those of the larger world outside It forms almost a little world by itself Again when the dentist excavates a small cavity in one of our teeth we feel the hard point of his instrument scraping in distinctly differing directions a surface which seems to our sensibility vaguely larger than the subsequent use of the mirror tells us it really is And though the directions of the scraping differ so completely *inter se* not one of them can be identified with the particular direction in the outer world to which it corresponds The space of the tooth sensibility is thus really a little world by itself which can only become congruent with the outer space-

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result of experience The spacial notions of one deprived of the sense of sight and reduced to the use of the other space senses must indeed be different from our own. But he continues: The existence of the striking disparities between our visual and our other space perceptions without confusing us and indeed without usually being noticed can only be explained by the tendency to interpret all dimensions *to their visual equivalents* But this author gives no reasons for saying visual rather than tactile and I must continue to think that probabilities point the other way so far as what we call real magnitudes are concerned

world by farther experiences which shall alter its bulk, identify its directions, fuse its margins, and finally imbed it as a definite part within a definite whole. And even though every joint's rotations should be felt to vary *inter se* as so many differences of direction in a common room, even though the same were true of diverse tracings on the skin and of diverse tracings on the retina respectively, it would still not follow that feelings of direction on these different surfaces are intuitively comparable among each other, or with the other directions yielded by the feelings of the semi-circular canals. It would not follow that we should immediately judge the relations of them all to each other in one space-world.

If with the arms in an unnatural attitude we feel things, we are perplexed about their shape, size, and position. Let the reader lie on his back with his arms stretched above his head, and it will astonish him to find how ill able he is to recognize the geometrical relations of objects placed within reach of his hands. But the geometrical relations here spoken of are nothing but identities recognized between the directions and sizes perceived in this way and those perceived in the more usual ways. The two ways do not fit each other intuitively.

How lax the connection between the system of visual and the system of tactile directions is in man, appears from the facility with which microscopists learn to reverse the movements of their hand in manipulating things on the stage of the instrument. To move the slide to the *seen* left they must draw it to the *felt* right. But in a very few days the habit becomes a second nature. So in tying our cravat, shaving before a mirror, etc., the right and left sides are inverted and the directions of our hand movements are the opposite of what they seem. Yet this never annoys us. Only when by accident we try to tie the cravat of another person do we learn that there are two ways of combining sight and touch perceptions. Let any one try for the first time to write or draw while looking at the image of his hand and paper in a mirror, and he will be utterly bewildered. But a very short training will teach him to undo in this respect the associations of his previous lifetime.

Prisms show this in an even more striking way. If the eyes be armed with spectacles containing slightly prismatic glasses with their bases turned, for example, towards the right, every object looked at will be apparently translocated to the left, and the hand put forth to grasp any such object will make the mistake of passing beyond it on the left side. But less than an hour of practice in wearing such spectacles rectifies the judgment so that no more mistakes are made. In fact the new-formed associations are already so strong, that when the prisms are first laid aside again the opposite error is committed, the habits of a lifetime violated, and the hand now passed to the right of every object which it seeks to touch.

The primitive chaos thus subsists to a great degree through life so far as our immediate sensibility goes. We feel our various objects and their bignesses together or in succession; but so soon as it is a question of the order and relations of many of them at once, our intuitive apprehension remains to the very end most vague and incomplete. Whilst we are attending to one or at most to two or three objects, all the others lapse, and the most we feel of them is that they still hover on the outskirts and can be caught again by turning in a certain way. Nevertheless *throughout all this confusion we conceive of a world spread out in*

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a perfectly fixed and orderly fashion and we believe in its existence The question is How do this conception and this belief arise? How is the chaos smoothed and straightened out?

Mainly by two operations Some of the experiences are apprehended to exist out and alongside of each other and others are apprehended to interpenetrate each other and to occupy the same room In this way what was incoherent and irrelative ends by being coherent and definitely related *nor is it hard to trace the principles* by which the mind is guided in this arrangement of its perceptions *in detail*

In the first place following the great intellectual law of economy we simplify unify and identify as much as we possibly can *Whatever sensible data can be attended to together we locate together Their several extents seem one extent The place at which each appears is held to be the same with the place at which the others appear They become in short so many properties of* ONE AND THE SAME REAL THING This is the first and great commandment the fundamental act by which our world gets spatially arranged

In this *coalescence in a thing* one of the coalescing sensations is held to *be* the thing the other sensations are taken for its more or less accidental *properties* or modes of appearance [1] The sensation chosen to be the thing essentially is the most constant and practically important of the lot most often it is hard*ness or weight But the hardness or weight is never without tactile b* [illegible] as we can always see something in our hand when [illegible] we equate the bulk felt with the bulk [illegible] is also apt to figure as of the essenc[illegible] ntly a shape so figures sometimes a temperature a taste [illegible] but for the most part temperature smell sound color or whatever other phenomena may vividly impress us simultaneously with the bulk felt or seen figure among the accidents Smell and sound *impress us it is true when we neither see nor touch the thing but th*[illegible] are strongest when we see or touch so we locate the *sou*[illegible] h in the touched or seen space whilst [illegible] flowing in a weakened form into [illegible] r things *In all this it will be obser ed the sense data a*[illegible] *spaces coalesce into one are yielded by different sense organs* Such data have no tendency to displace each other from consciousness but can be attended to together all at once Often indeed they vary concomitantly and reach a maximum together We may be sure therefore that the general rule of our mind is to locate IN *each other all* sensations which are associated *in simultaneous experience* and *do not interfere* with each other s perception [2]

Different impressions on the same sense organ do interfere with each other s perception and cannot well be attended to at once Hence *we do not locate them*

[1] *Cf* L pps n C mpl ation G undtat a l n et p 579

[2] Ventriloqu m shows th s v ry p ttily The v nt l qu t talks without moving his l p and at the same time draws our attention to a doll a box o som oth r object We forthwith locate the voice within this obj t On the st g an actor ign rant of music sometimes has to sing o play n the gu ta r v ol n H g es th ough the *m t n b f* our eyes v h lst in the orchestra or lse h e the mu c is pe form d But because as w hilst n we see the actor it is alm t imp ssible not to *h* the music as if c m ng from where he s ts or stands

in each other's spaces but arrange them in a serial order of exteriority each alongside of the rest in a space larger than that which any one sensation brings This larger space however is an object of conception rather than of direct intuition and bears all the marks of being constructed piecemeal by the mind The blind man forms it out of tactile locomotor and auditory experiences the seeing man out of visual ones almost exclusively As the visual construction is the easiest to understand let us consider that first

Every single visual sensation or field of view' is limited To get a new field of view for our object the old one must disappear But the disappearance may be only partial Let the first field of view be A B C If we carry our attention to the limit C it ceases to be the limit and becomes the centre of the field and beyond it appear fresh parts where there were none before A B C changes in short to C D E But although the parts A B are lost to sight yet their image abides in the memory and if we think of our first object A B C as having existed or as still existing at all we must think of it as it was originally presented namely as spread out from C in one direction just as C D E is spread out in another A B and D E can never coalesce in one place (as they could were they o [illegible] because they can never be perceived at once we m [illegible]
we get [illegible]
eral things wh [illegible]
of each other and we conceive that their juxtaposed paces must make a larger space A B C + C D E must in short be imagined to exist in the form of A B C D E or not imagined at all

We can usually reco er anythin lost from sight by moving our attention and e s back n its direct on and through these constant chan es every field of

[illegible]

felt and remembered and gradually (through association) this and that movement come in our thought to suggest this or that extent of fresh objects introduced Gradually too since the objects vary indefinitely in kind we abstract from their several natures and think separately of their mere extents of which extents the various movements remain as the only constant introducers and associates M e and more therefore do we think of mo ement and seen ex

[illegible]

that (whatever intrin c exten iveness the movements may appear endowed with) that see p e doutness which is the pattern of the abstract extensiveness which we imagine came to us originally from the retinal sensation

The muscular sensations of the eyeball *s gnify* this sort of visible spreadoutness just as this visible sp eadoutness may come in late experience to *s gn fy* the real bulks distances le gths and breadths known to touch and locomo-

Cf Shand i *Mind* xiii, p 340.

See g Bain *Th Senses and the Int llect* pp. 366–67 37

tion[1] To the very end however in us seeing men the quality the nature the *sort of thing we mean* by extensiveness would seem to be the sort of feeling which our retinal stimulations bring

In one deprived of sight the principles by which the notion of real space is constructed are the same Skin feelings take in him the place of retinal feelings in giving the quality of lateral spreadoutness as our attention passes from one extent of them to another awakened by an object sliding along Usually the moving object is our hand and feelings of movement in our joints invariably accompany the feelings in the skin But the feeling of the skin is what the blind man *means* by his skin so the size of the skin feelings stands as the absolute or real size and the size of the joint feelings becomes a sign of these Suppose for example a blind baby with (to make the description shorter) a blister on his toe exploring his leg with his finger tip and feeling a pain shoot up sharply the instant the blister is touched The experiment gives him four different kinds of sensation—two of them protracted two sudden The first pair are the movement feeling in the joints of the upper limb and the movement feeling on the skin of the leg and foot These attended to together have their extents identified as one objective space—the hand moves through the same space in which the leg lies The second pair of objects are the pain in the blister and the peculiar feeling the blister gives to the finger Their spaces also fuse and as each marks the end of a peculiar movement series (arm moved leg stroked) the movement spaces are *emphatically* identified with each other at *that* end Were there other small blisters distributed down the leg there would be a number of these emphatic points the movement spaces would be identified not only as totals but point for point[2]

[1] When for example a baby looks at its own moving hand it sees one object at the same time that it feels another Both nt rest its attention and it lo ates them t geth r But the felt object s size is the more constant size just as the felt object is on the whole the more interesting and important object and so the retinal sensations become r garded as its signs and have their *real pace values interpreted in tangible terms*

[2] The incoherence of the different primordial s nse spaces *nt se* is often made a pretext for denying to the primitive bodily feel ngs any patial quality at all Nothing is c mmoner than to hear it said Babies have originally no patial perception for when a baby s *toe* aches he does not place the pain in the toe He makes no definite mov ments of def nc and may be vaccinated without being held The facts are true enough but the int rpretation is all wrong What really happens is that *the baby d es not plac h s toe n the pain* for he knows nothing of his to as y t H has not attend d to it as a visual bject he has not *handled it with his fingers nor have its normal organic sensations or contacts* y t become interesting nough to be discr m nated f m the wh le massive f l ng f th f t r ev n of the leg to which it belongs In short the toe is n the a member of the baby s optical pace of his hand movement space nor an independent m mber *of his leg and foot* pace It has actually no mental existence yet save as this l ttle pain space What wonde then f the pain seem a little pace world all by its lf? But let the pain n e ass ciate itself with these other space worlds and its space will become part f th pace Let th baby *feel* the nurse stroking the l mb and awakening the pain v ry t me her fi ger passes t wards the toe let him look on and see her finge on the toe every tim the pain shoots up let him handle his foot himself and g t the pa n whene e the to c me into his fingers or h s mouth let m vin the leg exac bate the pain — nd ll is changed The pa of the p in becomes *identified* with that part of each of the other spa es wh h gets f lt when it awakens and by th r id ntity w th t th se p ts d nt fi d with each other and grow systematically connected as members of a larg xtensiv whole.

Just so with spaces beyond the body's limits Continuing the joint feeling beyond the toe the baby hits another object which he can still think of when he brings his hand back to its blister again That object at the end of that joint feeling means a new place for him and the more such objects multiply in his experience the wider does the space of his conception grow If wandering through the woods to-day by a new path I find myself suddenly in a glade which affects my senses exactly as did another I reached last week at the end of a different walk, I believe the two identical affections to present the same persisting glade and infer that I have attained it by two differing roads. The spaces walked over grow congruent by their extremities though apart from the common sensation which those extremities give me I should be under no necessity of connecting one walk with another at all The case in no whit differs when shorter movements are concerned If moving first one arm and then another the blind child gets the same kind of sensation upon the hand and gets it again as often as he repeats either process, he judges that he has touched the same object by both motions and concludes that the motions terminate in a common place From place to place marked in this way he moves and adding the places moved through one to another he builds up his notion of the extent of the outer world The seeing man s process is identical only his units which may be successive bird s-eye views are much larger than in the case of the blind.

Feelings in Joints and Feelings in Muscles

1. *Feelings of Movement in Joints*

I have been led to speak of feelings which arise in joints. As these feelings

pages may presumably have flagged

When, by simply flexing my right forefinger on its metacarpal joint, I trace with its tip an inch on the palm of my left hand is my feeling of the size of the inch purely and simply a feeling in the skin of the palm or have the muscular contractions of the right hand and forearm anything to do with it? In the preceding pages I have constantly assumed spatial sensibility to be an af fair f surfaces At first starting the consideration of the 'muscular sense as a space-measurer was postponed to a later stage Many writers of whom the foremost was Thomas Brown in his *Lectures on the Philosophy of the Human Mind* and of whom the latest is no less a Psychologist than Prof Delbœuf hold that the consciousness of active muscular motion aware of its own amount, is the *fons et origo* of all spatial measurement It would seem to follow if this theory were true that two skin feelings one of a large patch one of a small one

Pour quoi les sensations visuelles sont elles etendues? in *Revue philosophique* iv p. 6 — As the proofs of this chapter are being corrected, I receive the third part of Munsterberg' *Beiträge zur experimentellen Psychologie* in which that vigorous young psychologist reaffirms (if I understand him after so hasty a glance) more radically than ever the doctrine that muscular sensation proper is our one means of measuring extension. Unable to reopen the discussion here, I am in duty bound to call the attention of the reader to Herr M.'s work.

possess their difference of spatiality not as an immediate element but solely by virtue of the fact that the large one to get its points *successively* excited demands more muscular contraction than the small one does Fixed associations with the several amounts of muscular contraction required in this particular experience would thus explain the apparent sizes of the skin patches which sizes would consequently not be primitive data but derivative results

It seems to me that no evidence of the muscular measurements in question exists but that all the facts may be explained by surface sensibility provided we take that of the joint surfaces also into account

The most striking argument and the most obvious one which an upholder of the muscular theory is likely to produce is undoubtedly this fact if with closed eyes we trace figures in the air with the extended forefinger (the motions may occur from the metacarpal the wrist the elbow or the shoulder joint indifferently) what we are *conscious of* in each case and indeed most acutely conscious of is the geometric path described by the finger *tip* Its angles its subdivisions are all as distinctly felt as if seen by the eye and yet the surface of the finger tip receives no impression at all [1] But with each variation of the figure the muscular contractions vary and so do the feelings which these yield Are not these latter the sensible data that make us aware of the lengths and directions we discern in the traced line?

Should we be tempted to object to this supposition of the advocate of perception by muscular feelings that we have *learned* the spatial significance of these feelings by reiterated experiences of *seeing* what figure is drawn when each special muscular grouping is felt so that in the last resort the muscular space feelings would be derived from retinal surface feelings our opponent might immediately hush us by pointing to the fact that in persons born blind the phenomenon in question is even more perfect than in ourselves

If we suggest that the blind may have originally traced the figures on the cutaneous surface of cheek thigh or palm and may now remember the specific figure which each present movement formerly caused the skin surface to perceive he may reply that the delicacy of the motor perception far exceeds that of most of the cutaneous surfaces that in fact we can feel a figure traced only in its differentials so to speak —a figure which we merely *start* to trace by our finger tip a figure which traced in the same way *on* our finger tip by the hand of another is almost if not wholly unrecognizable

The champion of the muscular sense seems likely to be triumphant *until we invoke the articular cartilages* as internal surfaces whose sensibility is called in play by every movement we make however delicate the latter may be

To establish the part they play in our geometrizing it is necessary to review a few facts It has long been known by medical practitioners that in patients with cutaneous anæsthesia of a limb whose muscles also are insensible to the thrill of the faradic current a very accurate sense of the way in which the limb may be flexed or extended by the hand of another may be preserved [2] On the

[1] Even if the figure b d awn on a board instead of in the air the variations of contact on the finger s surface will b much simpler than the peculiarities of the trac d figure itself

[2] See for example Duchenne *El ctrisat on lo alisé* pp 727 770 Leyd n in V chow *Archiv* vol xxvii (1869)

other hand we may have this
sensibility is well preserved Th
can play in these cases no part
which the limb changes its position are passive ones imprinted on it y
experimenting physician The writers who have sought a *rationale* of the matter
have consequently been driven by way of exclusion to assume the articular sur
faces to be the seat of the perception in question

That the joint surfaces are sensitive appears evident from the fact that in
inflammation they h f excruciating pains and from the percep-
tion by everyone w
crease of the force
by the starting out
joints If the structure and r
faces be taken into account it will appear that granting the surfaces to *be* sensi
t ve no more favorable mechanical cond tions could be possible for the delicate
calling of the sensibility into play than are realized in the minutely graduated
rotations and firmly resisted variations of pressure involved in every act of
extension or flexion Nevertheless it is a great pity that we have as yet no
d rect testimony no express ons from patients with healthy joints acciden
tally laid open of the impressions they experience when the cartilage is
pr h d

pa
half of whose e was a
illus on about the position of his limb which disappeared the moment he lay
down aga n he thought h mself *knock kneed* If as Lewinski says we assume
the in er half of the joint to share the insens bility of the correspond ng part of
l

h s leg into a knock kneed attitude Lewinski was led by this case to examine
the feet of ce tain ataxic patients with imperfect sense of position He found in
every instance that when the toes were flexed *a d drawn upon* at the same time
(the joint surfaces drawn asunder) all sense of the amount of flexion disappeared On the contrary when he pressed a toe whilst flexing it the patient s
app eciation of the amount of flexion was much improved evidently because
the artificial increase of articular pressure made up for the pathological insensi
b l ty of the parts

S nce Lewinski s paper an important experimental research by A Gold
scheider[3] has appeared wh ch completely establishes our point This patient
observe caused his fingers arms and legs to be pass vely rotated upon their
var ous joints n a mechanical apparatus which registered both the velocity of
movement impressed and the amount of angular rotation No active muscular
contraction took place The minimal felt amounts of otat on were in all cases
surprisingly small being much less than a single angular degree in all the joints

Eg Eul b g *Lek b d* rv k kh t (B lin 878) I, p 3
Ube d hr ftsunn l k w A h l LXXVII p 34
A ch f (A at u.) Phy l gie (1889) pp 369 540.

except those of the fingers Such displacements as these the author says (p 490) can hardly be detected by the eye The point of application of the force which rotated the limb made no difference in the result Rotations round the hip-joint for example were as delicately felt when the leg was hung by the heel as when it was hung by the thigh whilst the movements were performed Anæsthesia of the skin produced by induction currents also had no disturbing effect on the perception nor did the various degrees of pressure of the moving force upon the skin affect it It became in fact all the more distinct in proportion as the concomitant pressure feelings were eliminated by artificial anæsthesia When the joints themselves however were made artificially anæsthetic the perception of the movement grew obtuse and the angular rotations had to be much increased before they were perceptible All these facts prove according to Herr Goldscheider that *the joint surfaces and these alone are the starting point of the impressions by which the movements of our members are immediately perceived*

Applying this result which seems invulnerable to the case of the tracing finger tip we see that our perception of the latter gives no countenance to the theory of the muscular sense *We indubitably localize the finger tip at the successive points of its path by means of the sensations which we receive from our joints* But if this is so it may be asked why do we feel the figure to be traced not within the joint itself but in such an altogether different place? And why do we feel it so much larger than it really is?

I will answer these questions by asking another Why do we move our joints at all? Surely to gain something more valuable than the insipid joint feelings themselves And these more interesting feelings are in the main produced upon the *skin* of the moving part or of some other part over which it passes or upon the eye With movements of the fingers we explore the configuration of all real objects with which we have to deal our own body as well as foreign things Nothing that interests us is located in the joint everything that interests us either *is* some part of our skin or is something that we see as we handle it The cutaneously felt and the seen extents come thus to figure as the important things for us to concern ourselves with Every time the joint moves even though we neither see nor feel cutaneously the reminiscence of skin events and sights which formerly coincided with that extent of movement ideally awaken as the movement s import and the mind drops the present sign to attend to the import alone The joint sensation itself as such does not disappear *in the process* A little attention easily detects it with all its fine peculiarities hidden beneath its vaster suggestions so that really the mind has two space perceptions before it congruent *in form but different in scale and place* either of which exclusively it may notice or both at once —the joint space which it *feels* and the real space which it *means*

The joint spaces serve so admirably as signs because of their capacity for *parallel variation* to all the peculiarities of external motion There is not a direction in the real world nor a ratio of distance which cannot be matched by some direction or extent of joint rotation Joint feelings like all feelings are roomy Specific ones are contrasted *inter se* as different directions are contrasted within the same extent If I extend my arm straight out at the shoulder the rotation of the shoulder joint will give me one feeling of movement if then I sweep the

arm for
these m
small m
directu — —
movement in so many different directions That we cann explain — — *should* is no presumption that they *do* not for we never can explain why any sense-organ should awaken the sensation it does.

But *if the joint feelings are* directions and extents standin in relation to each other the task of association in interpretin their import in eye- or skin-terms is a good deal simplified. Let the movement *bc* of a certain joint derive its absolute space-value from the cutaneous feelin it is always capable of engendering then the longer movement *abcd* of the same joint will be judged to have a greater space-value even though it may never have wholly merged with a skin-experience So of differences of direction so much joint-difference=so much skin-difference therefore more joint-difference=more skin-difference. *In fact the joint feeling can excellently serve as a map on a reduced scale of a reality which the imagination can identify at its pleasure with this or that sensible extension simultaneously known in some other way*

When the joint feelin in itself acquires an emotional interest —which happens whenever the joint is inflamed and painful—the secondary suggestions fail to arise and the movement is felt where it is and in its intrinsic scale of magnitude.

The localization of the joint feeling in a space simultaneously known otherwise (i.e to eye or skin) is what is commonly called the *extradition or eccentric projection of the feelin* In the precedin chapter I said a good deal on this subject but we must now see a little more closely just what happens in this instance of it The content of the joint feeling to begin with is an object, and is in itself a place For it to be *placed* say *in the elbow* the elbow as seen or handled must already have become another object for the mind and with its place *as thus known the place which the joint feelin tells* must coalesce. That the latter should be felt in the elbow is therefore a projection of it into the place of another object as much as its being felt in the finger tip or at the end of a cane can be. But when we say projection we generally have in our mind the notion of a *there* as contrasted with a *here* What is the *here* when we say that the joint feelin is *there?* The here seems to be the spot which the mind has chosen for its own post of observation usually some place within the head but sometimes within the throat or breast—not a rigorously fixed spot but a region

Direction in its first intention, of course direction with which so far we merely become acquainted and about which we know nothing save perhaps its difference from another direction a moment ago experienced in the same way!

I have said hardly an thing about the associations with the visual space in the foregoing chapter because I wished to represent process which the blind and the seeing man might

each other and left nothing but their common vastness behind. We shall see as we go on that this generic abstraction of space-magnitude from the various local peculiarities of feeling which accompanied it when it was for the first time felt, occurs on a considerable scale in the acquired perceptions of blind as well as of seeing men.

from any portion of which it may send forth its various acts of attention Extradition from either of *these* regions is the common law under which we perceive the whereabouts of the north star of our own voice of the contact of our teeth with each other of the tip of our finger of the point of our cane on the ground or of a movement in our elbow joint

But *for the distance between the here and the there to be felt the entire intervening space must be itself an object of perception* The consciousness of this intervening space is the *sine qua non* of the joint feeling s projection to the farther end of it When it is filled by our own bodily tissues (as where the projection only goes as far as the elbow or finger tip) we are sensible of its extent alike by our eye by our exploring movements and by the resident sensations which fill its length When it reaches beyond the limits of our body the resident sensations are lacking but limbs and hand and eye suffice to make it known Let me for example locate a feeling of motion coming from my elbow joint in the point of my cane a yard beyond my hand Either I see this yard as I flourish the cane and the seen end of it then absorbs my sensation just as my seen elbow might absorb it or I am blind and imagine the cane as an object continuing my arm either because I have explored both arm and cane with the other hand or because I have pressed them both along my body and leg If I project my joint feeling farther still it is by a conception rather than a distinct imagination of the space I *think* farther thrice as far etc and thus get a symbolic image of a distant path at which I point [1] But the absorption of the joint feeling by the distant spot in whatever terms the latter may be apprehended is never anything but that coalescence into one thing already spoken of on page 572 of whatever different sensible objects interest our attention at once

2 *Feelings of Muscular Contraction*

Readers versed in psychological literature will have missed in our account thus far the usual invocation of the muscular sense This word is used with extreme vagueness to cover all resident sensations whether of motion or position in our members and even to designate the supposed feeling of efferent discharge from the brain We shall later see good reason to deny the existence of the latter feeling We have accounted for the better part at least of the resident feelings of motion in limbs by the sensibility of the articular surfaces The skin and ligaments also must have feelings awakened as they are stretched or squeezed in flexion or extension And I am inclined to think that *the sensations of our contracting muscles themselves probably play as small a part in building up our exact knowledge of space as any class of sensations which we possess* The muscles indeed play an all important part but it is through the remote

[1] The deal enla gement of a syst m of sensations by the mind is n thing exc ptional Vision is full of t and in the manual a ts where a w orkman gets a t l large than the one he is accustomed to and has suddenly t adapt all his mo m nts t its scal wh he has to execute a familia set of mov m nts n an unnatu l p siti n of body wher a piano-player meets an instrument w th unusually broad na ov k ys wh a man has t lter the size of his hand w t ng—we se how p mptly th mind multipl nc fo all as it were the whole ser s of it ope ations by a constant factor and has not to trouble itself after that with further adjustment of the details.

effect of their contractions on other sensitive parts, not through their own resident sensations being aroused. In other words, *muscular contraction is only indirectly instrumental in giving us space perceptions by its effects on surfaces*. In skin and retina it produces a motion of the stimulus upon the surface; in joints it produces a motion of the surfaces upon each other—such motion being by far the most delicate manner of exciting the surfaces in question. One is tempted to doubt whether the muscular sensibility as such plays even a subordinate part as sign of these more immediately geometrical perceptions which are so uniformly associated with it as effects of the contraction objectively viewed.

For this opinion many reasons can be assigned. First, it seems *a priori* improbable that such organs as muscles should give us feelings whose variations bear any exact proportion to the spaces traversed when they contract. As G. E. Müller says,[1] their sensory nerves must be excited either chemically or by mechanical compression whilst the contractions last, and in neither case can the excitement be proportionate to the position into which the limb is thrown. The chemical state of the muscle depends on the *previous* work more than on the actually present contraction, and the internal pressure of it depends on the resistance offered more than on the shortening attained. *The intrinsic muscular sensations are likely therefore to be merely those of massive strain or fatigue, and to carry no accurate discrimination with them of lengths of path moved through.*

Empirically we find this probability confirmed by many facts. The judicious A. W. Volkmann observes that[2]

> Muscular feeling gives tolerably fine evidence as to the *existence* of movement, but hardly any direct information about its extent or direction. We are not aware that the contraction of the *supinator longus* has a wider range than those of a *pronator brevis*, and that the fibres of the bipenniform muscle contract in opposite directions, a fact of which the muscular feeling itself gives not the slightest intimation. Muscle-feeling belongs to that class of general sensations which tell us of our inner states, but not of their relations; *it does not belong among* the space-perceiving senses.

E. H. Weber, in his article *Tastsinn*, called attention to the fact that muscular movements as large and strong as those of the diaphragm go on continually without our perceiving them as motion.

G. H. Lewes makes the same remark: 'When we think of our muscular sensations as movements in space, it is because we have ingrained with them in our imagination a movement on a surface simultaneously felt.

> Thus whenever we breathe there is a contraction of the muscles of the ribs and the diaphragm. Since we see the chest expanding we know it as a movement, and can only think of it as such. But the diaphragm itself is not seen, and consequently by those not physiologically enlightened on this point is this diaphragm thought of as movement. Yes, even when told by a physiologist that the diaphragm moves at each breathing, every one who has not seen it moving downward pictures it as an upward movement because the chest moves upward.[3]

[1] *Pflüger's Archiv*, xxxv. p. 65.
[2] *Untersuchungen im Gebiete der Optik* (Leipzig, 1863), p. 188.
[3] *Problems of Life and Mind*, prob. vi, chap. iv, § 4.

A personal experience of my own seems strongly to corroborate this view For years I have been familiar during the act of gaping with a large round smooth sensation in the region of the throat a sensation characteristic of gaping and nothing else but which although I had often wondered about it never suggested to my mind the motion of anything The reader probably knows from his own experience exactly what feeling I mean It was not till one of my students told me that I learned its objective cause If we look into the mirror while gaping we see that at the moment we have this feeling the hanging palate *rises* by the contraction of its intrinsic muscles The contraction of these muscles and the compression of the palatine mucous membrane are what occasion the feeling and I was at first astonished that coming from so small an organ it could appear so voluminous Now the curious point is this—that no sooner had I learned by the eye its objective space significance than I found myself enabled mentally to *feel* it as a movement upwards of a body in the situation of the uvula When I now have it my fancy *injects* it so to speak with the image of the rising uvula and it *absorbs* the image easily and naturally In a word a muscular contraction gave me a sensation whereof I was unable during forty years to interpret a motor meaning of which two glances of the eye made me permanently the master To my mind no further proof is needed of the fact that muscular contraction merely as such need not be perceived directly as so much motion through space

Take again the contractions of the muscles which make the eyeball rotate The feeling of these is supposed by many writers to play the chief part in our perceptions of extent The space seen between two things *means* according to these authors nothing but the amount of contraction which is needed to carry the *fovea* from the first thing to the second But close the eyes and note the contractions in themselves (even when coupled as they still are with the delicate surface sensations of the eyeball rolling under the lids) and we are surprised at finding how vague their space import appears Shut the eyes and roll them and you can with no approach to accuracy tell the outer object which shall first be seen when you open them again Moreover if our eye muscle contractions had much to do with giving us our sense of seen extent we ought to have a natural illusion of which we find no trace Since the feeling in the muscles grows disproportionately intense as the eyeball is rolled into an extreme eccentric position all places on the extreme *margin* of the field of view ought to appear farther from the centre than they really are for the fovea cannot get to them without an amount of this feeling altogether in excess of the amount of actual rotation *When we turn to the muscles of the body at large we find the same*

[1] Volkmann *op cit* p 189 Compare also what Hering says of the inability in his own case to make after images seem to move when he rolls his closed eyes in their sockets and of the insignificance of his feelings of convergence for the sense of distance (*Beitr zur Physiologie* 1861–62 pp 31 141) Helmholtz also allows to the muscles of convergence a very feeble share in producing our sense of the third dimension (*Physiologische Optik* pp 649–59)

[2] *Cf* Lipps *Psychologische Studien* (1885) p 18 and the other arguments given on pp 12 to 27 The most plausible reasons for contractions of the eyeball muscles being admitted as original contributors to the perception of extent are those of Wundt (*Physiologische Psychologie* II pp 96–100) They are drawn from certain constant errors in our estimate of lines and angles which however are susceptible, all of them, of different interpretations

vagueness Goldscheider found that the minimal perceived rotation of a limb about a joint was no less when the movement was active or produced by muscular contraction than when it was passively impressed.[1] The consciousness of active movement became so blunt when the joint (alone!) was made anæsthetic by faradization that it became evident that the feeling of contraction could never be used for *fine* discrimination of extents And that it was not

(see some [illegible] them farther on)—Just as my MS goes to the printer Herr Munsterberg *Beit* [illegible] *ur Experiment llen Psych logie* Part 2 comes into my hands with experiments [illegible] th [illegible] new pro e th feeling th measurement f pace ec ded m it, which, in the [illegible] f extent. As Munsterbe g w k d f muscular strain t be principal facto in [illegible] three h urs day f year and half at mparin the length of lines, seen with his yes in different positions and as h carefully eraged and "percented ,000 bsers ti ns, his conclusio must be listened to with great respect. Briefly it is this, that ur j dgments of size depend compariso of the intensity f the feelings f m ment which arise in our eyeball muscles as we glance er the distance, and which fuse with th sensations f light" (p. 42)

The facts upo which th conclusion is based are certain constant errors which Munsterberg f und according as the standard or given interval was to th right o the left f the interval to be marked ff as equal to it, as t was bo bel w t, tood in some m re complicated relati still. H dmits that he cann t explain ll th err rs in d tail, and that w stand bef results which seem surprising and n t to be unr elled, because w cannot analyze th elements which enter into th complex sensati n which w ecei e." B t h has no d bt whatever f the general f ct "that the m ements f th yes and the sense f their positi when fixed exert so decisi an infl nce ur estimat f the paces seen that th rrors cann t possibly be explained by anything else than the mo ement feelings and their rep [illegible] mem ry (66 67)

It is presumpt u [illegible] yet th are mb [illegible] Herr M *duct m.* [illegible] lying to th right, ar [illegible] as result f th h. [illegible] lines i m left to ri, [illegible] across th page. As w *measur* [illegible] measure from right to left than th ther way and an interval l in t th left seems t us nsequently lon er than it really is. N w I ha bee eade f m re years than Herr Munst rberg and yet with me there is trongly pron unced erro th ther way It is th right ward lying interval which t me seems longer than it really is. M reo er Herr M. w ars ca spectacles, and looked thr ugh them with his *head fi ed* May t n t be that some f th errors wer d t dist rti f th retinal image, as th y looked l er th h the centre b t thr gh the margin f th glas.? In sh rt, with all th presumptions which w ha seen against muscular contractio being definitely felt as length I think that the ma be xplanati ns f Herr M results which ha escaped e en his sagacity and I call f suspensio of judgment until they shall ha been nfirmed by th bservers I do no myself d t that ur feeling f seen extent may be *alter d* by concomitant muscular feelings.

In Chapter xvii (pp 469-7) w saw many examples of similar alterations, interferences w th exaltati ns f th sensory effect f ne nerve p ocess by an ther I d t see why currents from the muscle eyelids, coming in at the same time with retinal impressi n, might not make the latte seem bigger in th same w y that greater *int nsity* in th tinal stimulation makes t seem bigger in th way that great extent f surf ce cited m kes h col f th su face seem stronger if t be sain-s rfac makes ts heat seem

quit d[illegible]erent f m this the bigness belo gs t th muscular feelings, as such, and is merely associ[illegible] d with those of the retina. *This* is what I deny

[1] *Archi f (Anat u.) Physiol.* (889) p. 542.

used for coarse discriminations appeared clear to Goldscheider from certain other results which are too circumstantial *for me to quote in detail*[1] *His* general conclusion is that we feel our movements exclusively in our articular surfaces and that *our muscular contractions* in all probability hardly occasion this sort of perception at all[2]

My conclusion is that the muscular sense must fall back to the humble position from which Charles Bell raised it and no longer figure in Psychology as the leading organ in space perception which it has been so long cracked up to be

Before making a minuter study of Space as apprehended by the eye we must turn to see what we can discover of space as known to the blind But as we do so let us cast a glance upon the results of the last pages and ask ourselves once more whether the building up of orderly space perceptions out of primitive incoherency requires any *mental powers beyond those displayed in ordinary* intellectual operations I think it is obvious—granting the spatial *quale* to exist *in the primitive sensations—that discrimination association addition* multiplication and division blending into generic images substitution of similars *selective* emphasis and abstraction from uninteresting details are quite capable of giving us all the space perceptions we have so far studied without the aid of any mysterious mental chemistry or power of synthesis to create elements absent from the original data of feeling It cannot be too strongly urged in the face of mystical attempts however learned that there is not a landmark not a length not a point of the compass in real space which *is* not some *one* of our feelings either experienced directly as a presentation or ideally suggested by another feeling which has come to serve as its sign In degrading some sensations to the rank of signs and exalting others to that of realities signified we smooth out the wrinkles of our first chaotic impressions and make a continuous order of what was a rather incoherent multiplicity But the *content* of the order remains identical with that of the multiplicity—sensational both through and through

How the Blind Perceive Space

The blind man s construction *of real* space *differs from that of the seeing* man most obviously in the larger part which synthesis plays in it and the relative subordination of analysis The *seeing baby s eyes take in the whole room* at once and discriminative attention must arise in him before single objects are visually discerned The blind child on the contrary *must form his mental* image of the room by the addition piece to piece of parts which he learns to know successively With our eyes we may apprehend instantly *in an enormous bird s-eye* view a landscape which the blind man is condemned to build up bit by bit after perhaps weeks of exploration We are *exactly in his predicament* however for spaces which exceed our visual range We think the ocean as a whole by multiplying mentally the impression we get at any moment when *at sea* The

[1] *Ibid* p 496

[2] *Ibid* p 497 Goldscheider thinks that [illegible] muscles do not even give us the feeling of *resistance* that being also due to the articular surfaces whilst *weight* is due to the tendons. *Ibid* p 541

distance between New York and San Francisco is computed in days journeys that from earth to sun is so many times the earth s diameter etc and of longer distances still we may be said to have no adequate mental image whatever but only numerical verbal symbols

But the symbol will often give us the emotional effect of the perception Such express ons as the abysmal vault of heaven the endless expanse of ocean etc. summarize many computations to the imagination and give the sense of an enormous horizon So it [illegible] bl d They multiply mentally the amount of a distinctly felt [illegible] vaster freedom still Thu [illegible] ness of their horizon Th [illegible] who can describe to them [illegible] great openness in valleys they feel closed in and one has to [illegible] thought few seeing people could enjoy the view from a mountain top more than he A bl nd person on enterin a house or room immediately receives from the reverberations of his voice and steps an impression of its dimensions and to a certain extent of its arrangement The tympanic sense noticed on p 544 *supra* comes in to help here and possibly other forms of tactile sensibility not yet understood Mr W Hanks Levy the blind author of *Blindness and the Blind* (London) gives the following account of his powers of perception

[illegible] whether walkin, or standing still I

I ca t usually pe cei bject it muc [illegible] erv l w bjects can be d tected This m y depend n the natur of the objects or on som b rmal tate f th atmo phere The currents of air can ha e nothing to do w th this power as the state of the wind does not directly affect t the sense of hearing has nothing to do with t as when sn w lies thickly on the ground objects are m e di tinct alth gh the footfall cann t b heard. I seem t percei e bjects through the kin of my face and to have the impressions imm diately transmitted t the brain The only part of my body posse sing this powe s my f ce this I have a rtai d by uitable experiments. St pping my e rs do n t int rfe with t but n g my f c w th thi k eil de t oys it alto eth r None of the fi e senses ha thi g to do with th existen of this power and the circumstances abo e nam d ind ce me t call this unrec gnized sense by the name of facial pe ception.

When pas ing al g treet I can di t nuish sh ps f om pri te houses and e en po t t th doors and window et and this whether the doo s be hut or open. When a window c nsist f o e entire sheet f glass it s m re difficult to dis e than on composed of a numbe f small panes. F m this t would ppea that glass [illegible] of sen tı o at any rate of the s nsati specially onn cted

[illegible]

t them, and said they were higher We however mea ured, and f und them b ut three in hes lower than my shoulder At th tim f making this observ ti n I was bout f ur f t f m th ails Certainly in thi instanc f cial perc ption was more accurat than sight When the lower part of a fence is brick w k, and the upper

part rails the fact can be detected and the line where the two meet easily perceived Irregularities in height and projections and indentations in walls can also be di cov ered

According to Mr Levy this power of seeing with the face is diminished by a fog but not by ordinary darkness At one time he could tell when a cloud obscured the horizon but he has now lost that power which he has known sev eral persons to possess who are totally blind These effects of aqueous vapor suggest immediately that fluctuations in the heat radiated by the objects may be the source of the perception One blind gentleman Mr Kilburne an in structor in the Perkins Institution in South Boston who has the power spoken of in an unusual degree proved however to have no more delicate a sense of temperature in his face than ordinary persons He himself supposed that his ears had nothing to do with the faculty until a complete stoppage of them not only with cotton but with putty on top of it by abolishing the perception entirely proved his first impression to be erroneous Many blind men say immediately that their ears are concerned in the matter

Sounds certainly play a far more prominent part in the mental life of the blind than in our own In taking a walk through the country the mutations of sound far and near constitute their chief delight And to a great extent their imagination of distance and of objects moving from one distant spot to another seems to consist in thinking how a certain sonority would be modified by the change of place It is unquestionable that the semi circular canal feelings play a great part in defining the points of the compass and the direction of distant spots in the blind as in us We *start* towards them by feelings of this sort and so many directions so many different feeling starts

The only point that offers any theoretic difficulty is the prolongation into space of the direction after the start We saw six pages back that for extradi tion to occur beyond the skin the portion of skin in question *and* the space be- yond must form a common object for some other sensory surface The eyes are for most of us this sensory surface for the blind it can only be other parts of the skin coupled or not with motion But the mere gropings of the hands in every direction must end by surrounding the whole body with a sphere of felt space And this sphere must become enlarged with every movement of locomo- tion these movements gaining their space values from the semi circular canal feelings which accompany them and from the farther and farther parts of large fixed objects (such as the bed the wainscoting or a fence) which they bring within the grasp It might be supposed that a knowledge of space acquired by so many successive discrete acts would always retain a somewhat jointed and so to speak granulated character When we who are gifted with sight think of a space too large to come into a single field of view we are apt to imagine it as composite and filled with more or less jerky stoppings and startings (think for instance of the space from here to San Francisco) or else we reduce the scale symbolically and imagine how much larger on a map the distance would look than others with whose totality we are familiar

1 Whilst the memor s which w se ing f lks p e of a man all ent e und rt n exterior form composed of his mage, his h ght h ga t n the bl nd all th m mori are referred to omethin, quite diff r nt namely *th und of l s v ic* (Dunan in *R v Ph l* xxv p 357)

I am disposed to believe after interrogating many blind persons that the use of imaginary maps on a reduced scale is less frequent with them than with the rest of us. Possibly the extraordinary changeableness of the visual magnitudes of things makes this habit natural to us, while the fixity of tactile magnitudes keeps them from falling into it. (When the blind young man operated on by Dr Franz was shown a portrait in a locket he was vastly surprised that the face could be put into so small a compass it would have seemed to him he said as impossible as to put a bushel into a pint.) Be this as it may however the space which each blind man feels to extend beyond his body is felt by him as one smooth continuum—all trace of those muscular startings and stoppings and reversals which presided over its formation having been eliminated from the memory It seems in other words a generic image of the space-element common to all these experiences with the unessential particularities of each left out. In truth *where* in this space a start or a step may have occurred was quite accidental It may never occur just there again and so the attention lets it drop altogether Even as long a space as that traversed in a several mile walk will not necessarily appear to a blind man s thought in the guise of a series of locomotor acts. Only where there is some distinct locomotor difficulty such as a step to ascend a difficult crossing or a disappearance of the path will distinct locomotor images constitute the idea. Elsewhere the space seems continuous and its parts may even all seem coexistent though as a very intelligent blind friend once remarked to me To think of such distances involves probably more mental wear and tear and brain waste in the blind than in the seeing This seems to point to a greater element of successive addition and construction in the blind man s idea.

Our own visual explorations go on by means of innumerable stoppings and startings of the eyeballs. Yet these are all effaced from the final space-sphere of our visual imagination. They have neutralized each other We can even distribute our attention to the right and left sides simultaneously and think of those two quarters of space as coexistent Does the smoothing out of the locomotor interruptions from the blind man s tactile space-sphere offer any greater paradox? Surely not And it is curious to note that both in him and in us there is one particular locomotor feeling that is apt to assert itself obstinately to the last. We and he alike spontaneously imagine space as lying *in front* of us for reasons too obvious to enumerate. If we think of the space behind us, we, as a rule have to *turn round* mentally and in doing so the front space vanishes. But in this as in the other things of which we have been talking individuals differ widely Some in imagining a room can think of all its six surfaces at once Others mentally turn round or at least imagine the room in several successive and mutually exclusive acts (cf p 457 above)

Sir William Hamilton and J S Mill after him have quoted approvingly an opinion of Platner (an eighteenth-century philosopher) regarding the space-perceptions of the blind Platner says

The attentive observation of a person born blind has convinced me that the sense of touch by itself is altogether incompetent to afford us the representation of extension and space. In fact, to those born blind, time serves instead of space.

Vicinity and distance mean in their mouths nothing more than the shorter or longer time necessary to attain from some one feeling to some other

After my own observation of blind people I should hardly have considered this as anything but an eccentric opinion worthy to pair off with that other belief that color is *primitively seen without extent* had it not been for the remarkable Essay on Tactile and Visual Space by M Ch Dunan which appeared in the *Revue philosophique* for 1888 This author quotes[1] three very competent witnesses all officials in institutions for the blind (it does not appear from the text that more than one of them was blind himself) *who say that blind people only live in time* M Dunan himself does not share exactly this belief but he *insists that the blind man s and the seeing man s representation of space have absolutely naught* in common and that we are deceived into believing that what they mean by space is analogous to what we mean by the fact that so many of them are but semi blind and still think in visual terms and from the farther fact that they all *talk* in visual terms just like ourselves But on examining M Dunan s reasons one finds that they all rest on the groundless logical assumption that the perception of a geometrical form which we get with our eyes and that which a blind man gets with his fingers must either be absolutely identical or absolutely unlike They cannot be similar in diversity for they are simple notions and it is of the essence of such to enter the mind or leave it all at once so that one who has a simple notion at all possesses it in all its completeness.

Therefore since it is impossible that the blind should have of the forms in question ideas *completely identical* with our seeing ones it follows that their ideas must be *radically different from and wholly irreducible to our own* [2] Hereupon M Dunan has no difficulty in finding a blind man who still preserves a crude sensation of diffused light and who says when questioned that *this light has no extent* Having no extent appears however on farther questioning to signify merely not enveloping any particular tactile objects nor being located within their outline so that (allowing for latitude of expression) the result tallies perfectly with our own view A relatively stagnant retinal sensation of diffused light not varying when different objects are handled would naturally remain an object quite apart If the word extent were habitually used to denote tactile extent this sensation having no tactile associates whatever would naturally have extent denied of it And yet all the while it would be *analogous* to the tactile sensations in having the quality of bigness Of course it would have *no other* tactile qualities just as the tactile objects have no other optical qualities than bigness All sorts of analogies obtain between the spheres of sensibility Why are sweet and soft used so synonymously in most languages? And why are both these adjectives applied to objects of so many sensible kinds? Rough sounds heavy smells hard lights cold colors are other examples Nor does it follow from such analogies as these that the sensations compared need be composite and have some of their parts identical We saw in Chapter XIII that likeness and difference are an elementary relation not to be resolved in every case into a mixture of absolute identity and absolute heterogeneity of content (*cf* pp 321–22)

I conclude then that although in its more superficial determinations the blind man s space is very different from our space yet a deep analogy remains be-

[1] Vol. XXV pp 357–58 [2] *Loc cit* p 135

tween the two Big' and little far and near are similar contents of con sciousness in both of us But the *measure* of the bigness and the farness is very different in him and in ourselves He for example can have no notion of what we mean by objects appearing smaller as they move away because he must al ways conceive of them as of their constant tactile size Nor whatever analogy the two extensions involve should we expect that a blind man receiving sight for the first time should recognize his new given optical objects by their familiar tactile names Molyneux wrote to Locke

Suppose a man born blind and n w adult and taught by his touch to distinguish between a cube and a sphe e so as to tell when h felt one and the other which is the cube, which the sphe e. Suppose then the cube and sphere placed on a table and the blind man to be made to see query whether by his sight, bef re he t uched them he could now distinguish and tell which is the globe which the cube?

This has remained in literature as Molyneux s query Molyneux answered No And Locke says [1]

I agree with this thinking gentleman wh m I am p oud to call my friend, and am of pinio that th blind man t first sight would not be ble to say which was the globe which the cube whilst he only saw them th ugh he could unerringly name them by his to ch and certainly distinguish them by the difference of their figures felt.

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r

That the analogy of inner nature between the retinal and tactile sensations goes beyond mere extensity is pro ed by the cases where the patients were the most intell gent as in the youn man operated on by Dr Franz who named circular triangular and quadrangular figures at first sight

Visual Space

It is whe we come to analyze minutely the conditions of *visual* perception that difficult es arise wh ch have made psychologists appeal to new and *quasi* m th cal mental powers But I firmly believe that even here exact investigation will yeld the same ve d ct as in the cases studied h therto This subject will close ou survey f the facts and if it gi e the result I foretell we shall be in the best of pos tions for a few final pages of critically historical review

Essay H ma Underst ndi g, bk. ii, chap ix, § 8

Philosophical T ansacti 84 In T K. Abbott *Sight nd T uch* ther is good discussi f these cases Ob usly positi e cases are f mo importance than egati An unee ted peasant, Noé M., h se case is described by D Duf ur f Lausanne (*Guérison d' gle nd* 8 6) is m ch mad f by MM. N ille and Dunan b t t seems t m ly sh w h w little m people can deal with ew experi nces in which thers find themsel es quickly at home. This man could not even tell whether one f his first bjects of sight m ed tood still (p. 9)

If a common person is asked how he is enabled to see things as they are he will simply reply *by opening his eyes and looking* This innocent answer has however long since been impossible for science There are various paradoxes and *irregularities about what we appear to perceive* under seemingly identical optical conditions which immediately raise questions To say nothing now of the time honored conundrums of why we see upright with an inverted retinal picture and why we do not see double and to leave aside the whole field of color contrasts and ambiguities as not directly relevant to the space-problem —it is certain that the same retinal image makes us see quite differently sized and differently shaped objects at different times and it is equally certain that the same ocular movement varies in its perceptive import It ought to be possible were the act of perception completely and *simply* intelligible to assign for every distinct judgment of size shape and position a distinct optical modification of some kind as its occasion And the connection between the two ought to be *so constant that given the same modification we should* always have the same judgment But if we study the facts closely *we soon find no such constant connection between either judgment and retinal modification or judgment and muscular modification to exist* The judgment seems to result from the combination of retinal muscular and intellectual factors with each other and any one of them may occasionally overpower the rest in a way which seems to leave the matter subject to no simple law

The scientific study of the subject if we omit Descartes began with Berkeley and the particular perception he analyzed in his *New Theory of Vision* was that of distance or depth Starting with the physical assumption that a difference in the distance of a point can make no difference in the nature of its retinal image since distance being a line directed endwise to the eye it projects only one point in the fund of the eye—which point remains invariably the same whether the distance be longer or shorter he concluded that distance could not possibly be a visual sensation but must be an intellectual suggestion from custom of *some non visual experience* According to Berkeley this experience was tactile His whole treatment of the subject was excessively vague —no shame to him *as a breaker of fresh ground* —*but as it has been adopted and enthusiastically* hugged in all its vagueness by nearly the whole line of British psychologists who *have succeeded him it will be well for us to begin our study of vision by refuting* his notion that depth cannot possibly be perceived in terms of purely visual feeling

The Third Dimension

Berkeleyans unanimously assume that no retinal sensation can primitively be of volume if it be of extension at all (which they are barely disposed to admit) it can be only of two- not of three dimensional extension At the beginning of the present chapter we denied this and adduced facts to show that all objects of sensation are voluminous in three dimensions (*cf* p 541 ff) It is impossible to lie on one s back on a hill to let the empty abyss of blue fill one s whole visual field and to sink deeper and deeper into the merely sensational mode of consciousness regarding it without feeling that an indeterminate palpitating circling depth is as indefeasibly one of its attributes as its breadth We may artificially exaggerate this sensation of depth Rise and look from the hill

top at the distant view
of the uttermost horizo... —
will be a startling increase in the perspective a most sens u e l ... —
maximum distance and as you raise the head you can actually see the horizon
line again draw near

Mind I say nothing as
depth or distance I only —
table optical consort of the two other optical dimensions The ne u —
always a *volume* unit Whatever be supposed to be its absolute and real size
the relative sizes of its dimensions are functions of each other Indeed it happens perhaps most often that the breadth and hei ht feeling take their absolute
measure f om the depth feelin If we plunge our head into a wash basin the
felt nearness of the bottom makes us feel the lateral expanse to be small If on
the contrary we are on a mountain top the distance of the horizon carries with
it in our judgment a proportionate height and length in the mountain chains
that bound it to our iew But as aforesa d let us not consider the question of
absolute size now —it must later be taken up in a thorough way Let us confine
ourselves to the way in wh ch the three dimensions which are seen get their
values fixed *elat ely to each other*

Reid in his *I qu ry into the Human M nd* has a sect on Of the Geometry
of V is bles in wh ch he assumes to trace what the perceptions would be of a
race of Idomenians reduced to the sole sense of sight Agreeing with Berkeley
th t s ght alone can give no knowledge of the third dimension he humorously
deduces arious ingenious absurdities in their interpretations of the material appea ances before the r eyes

Now I firmly bel e e on the contrary that one of Reid s Idomenians would
frame p ecisely the same conception of the external world that we do if he had
our intellectual powers Even were his very eyeballs fixed and not movable

su
in

ima cs see — — —

p 4) f ne-eyed persons g t t as tr ngly as th se with tw yes. I cann t find t t be ect d w th any alte tio in th p pil w th any ascertainabl train in th muscles of th y ympathizing with th se f th body Th exagg rati f distan is ev g eat h th w th head back ards and tra t per cti in g ttin th w tha h be d f ward and tract th inf ri recti Making th eyes di g slightly b ak prismati glasses has ch ffect T m and t all wh m I ha asked t repeat the bserv tion, th result is so marked that I d t well nderstand h w such an bserver as H lmh ltz, wh has caref lly examined visio w th in ted head, ca ha look d t (See his *Phy Optik* pp 433 3 7 8 7) I cann t help thinking that any who plain th ggeratio f th depth sensatio in this case will t th sam tim thr w m h light ts normal constit ti n.

In Fror p *N tizen* (838 July) N 133 is to be f und detailed acc nt w th a pic e, f an Esthonian girl, E a La k, the f rteen years ld, born with neithe arms no legs hich concl des w th th f ll ing ords Acco ding t th m th her tellect dev loped quit fast as that f her b th and si t rs particula sh cam as quickly to ight j dgment f th siz and distanc f isible bjects, alth ugh f rs sh had no use f hands. (Schopenhauer *W lt als W ule* ii, p. 44.)

like ours that would only retard not frustrate his education For the *same ob ject* by alternately covering in its lateral movements different parts of his ret ina would determine the mutual equivalencies of the first two dimensions of the field of view and by exciting the physiological cause of his perception of depth in various degrees it would establish a scale of equivalency between the first two and the third

First of all one of the sensat ... resent its real ... p 568 and 569 ... *present and the thing then measures* ... *sensations* The peripher ... of the retina are ... d with the central hv

the one near shorter its ed near end ... and then reappear on the opposite side and finally on that side resume its original length ... o become a familiar exp ... s

... an the ... *it re-* ... r end ... oy at ... psed the *difference* of *its distance* ... at end s distance must be judged equal to the stick s whole length? But that length has already been judged equal to a certain optical sensation of breadth *Thus we find that given amounts of the* ... *feeling become signs of fixed amount* ... *of dis* ... *visual*

... and suppose he advances and ... it and less and e feels the end men to be eral image on his retina at ... en? Why half the length ... as originally seen of course but this length was a moment ago a retinal object spread out laterally before his sight He has now merely equated a retinal depth feeling with a retinal breadth feeling If the regiment moved and the colonel stood still ... uld be the same In such ways ... ould hardly fail of ... And we ourselves ... is

Let us then admit distance to be at least as genuinely optical a content of consciousness as either height or breadth The question immediately returns Can any of them be said in any strictness to be optical sensations? We have con tended all along for the affirmative reply to this question but must now cope with difficulties greater than any that have assailed us hitherto

Helmholt and Reid on Sensations

A sensation is as we have seen in Chapter xvii the mental affection that fol lows most immediately upon the stimulation of the sense-tract Its antecedent is directly physical no psychic links no acts of memory inference or associa tion intervening Accordingly if w nose the nexus between neural process in the sense-organ on the one han by nature uniform *the same proc* and conversely *f what seems to sense organ remains nchanged t e t us se sation but a higher me tal prod ct whereof the variations depend on e ents occurr ng in the system of h gher cereb al cent es*

Now the s e of the field of view varies enormously in all three dimensions w thout our being able to assign with any definiteness the process in the visual t depends We just saw how impossible such assign r

mensions seem to follow If to use the former instance I look t f the fi ld hrinks p oportionately to its nearness If I b

to a y one of them as being its absolutely re ular concomitant Conver ence accommodation double and disparate images differences in the parallactic dis-placement when we mo e our head faintness of tint dimness of outline and smallness of the etinal image of objects named and known are all processes that ha e *someth g to do* with the perception of far and of near but the effect f each and any one of them in determining such a perception at one mo-me t may at another moment be reversed by the presence of some other sensible qual t n the object that makes us ev dently by remindin us of past experi ence judge it to be at a different distance and of another shape If we pa nt the in de of a pasteboard mask like the outs de and look at it with one eye the accommodation and parallax feelings are there but fail to make us see it hol low as t is O r mental knowledge of the fact that human faces are always con e overpowers them and we directly perceive the nose to be nearer to us than the cheek instead of farther off

stances fa or a strong intellectual conviction that the object presented to the

gaze is *improbable*—cannot be either *what* or *where* they would make us perceive it to be

Now the query immediately arises *Can the feelings of these processes in the eye since they are so easily neutralized and reversed by intellectual suggestions ever have been direct sensations of distance at all?* Ought we not rather to assume since the distances which we see *in spite* of them are conclusions from past experience that the distances which we see *by means* of them are equally such conclusions? Ought we not in short to say unhesitatingly that distance must be an intellectual and not a sensible content of consciousness and that each of these eye-feelings serves as a mere signal to awaken this content our intellect being so framed that *sometimes it notices one signal more readily and* sometimes another?

Reid long ago (*Inquiry* chap vi sec 17) said

> It may be taken for a general rule that things which are produced by custom may be undone or changed by disuse or by contrary custom On the other hand it is a strong argument that an effect is not owing to custom but to the constitution of nature when a contrary custom is found neither to change nor to weaken it

More briefly a way of seeing things that can be unlearned was presumably learned and only what we cannot unlearn is instinctive

This seems to be Helmholtz s view for he confirms Reid s maxim by saying in emphatic print

> No elements in our perception can be sensational which may be overcome or reversed by factors of demonstrably experimental origin Whatever can be overcome by suggestions of experience must be regarded as itself a product of experience and custom If we follow this rule it will appear that only *qualities* are sensational whilst almost all *spatial* attributes are results of habit and experience [1]

This passage of Helmholtz s has obtained it seems to me an almost deplorable celebrity The reader will please observe its very radical import Not only would he and does he for the reasons we have just been ourselves considering deny distance to be an optical sensation but extending the same method of criticism to judgments of size shape and direction and finding no single retinal or muscular process in the eyes to be indissolubly linked with any one of these he goes so far as to say that all optical space perceptions whatsoever must have an intellectual origin and a content that no items of visual sensibility can account for [2]

As Wundt and others agree with Helmholtz here and as their conclusions if true are irreconcilable with all the sensationalism which I have been teaching hitherto it clearly devolves upon me to defend my position against this new attack But as this chapter on Space is already so overgrown with episodes and details *I think it best to reserve the refutation of their general principle* for the next chapter and simply to assume at this point its untenability This has of course an arrogant look but if the reader will bear with me for not very many

[1] *Physiol Optik* p 438 Helmholtz s reservation of qualities is inconsistent Our judgments of light and color vary as much as our judgments of size shape and place and ought by parity of reasoning to be called intellectual products and not sensation In other places he does treat color as if it were an intellectual product

[2] It is needless at this point to consider what Helmholtz s views of the nature of the intellectual space yielding process may be. He vacillates—we shall later see how

pages more I shall hope to appease his mind Meanwhile I affirm confidently that *the same outer objects actually* FEEL *different to us according as our brain reacts on them in one way or another by making us perceive them as this or as that sort of thing* So true is this that one may well with Stumpf[1] reverse Helmholtz s query and ask What would become of our sense-perceptions in case experience were *not* able so to transform them? Stumpf adds All wrong perceptions that depend on peculiarities in the organs are more or less perfectly corrected by the influence of imagination following the guidance of experience

If therefore among the facts of optical space perception (which we must now proceed to consider in more detail) we find instances of an identical organic eye-process giving us different perceptions at different times in consequence of different collateral circumstances suggesting different objective facts to our imagination we must not hastily conclude with the school of Helmholtz and Wundt that the organic eye process pure and simple without the collateral circumstances is incapable of giving us any sensation of a patial kind at all We must rather seek to discover *by what means* the circumstances can so have transformed a space-sensation which but for their presence would probably have been felt in its natural purity And I may as well say now in advance that we shall find the means to be nothing more or less than association —*the suggestion to the mind of optical objects not actually present* but more habitually associated with the collateral circumstances than the sensation which they now displace and bein imagined now with a *quasi* hallucinatory strength But before this conclusion emerges it will be necessary to have reviewed the most important facts of optical space-perception in relation to the organic conditions on which they depend Readers acquainted with German optics will excuse what is already fam liar to them in the following section

Let us begin the long and rather tedious inquiry by the most important case

[1] *Op cit* p 4

B f mb king this w t p t ill b w l t sh l f ll th p blem f wh t is th physi l gical p oces th t md

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parallax.
w
e-f ling
ti n. Th
mo e
p od ed
gend
aness, and
se f w ll

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They h lp
al d t
byss f
d lies the

ertain a
dmit that
y fixed lative distances
ued, but determined each tim by experience in th widest sense f th

Physiologists have long sought for a simple law by which to connect the seen direction and distance of objects with the retinal impressions they produce Two principal theories have been held of this matter the theory of identical points and the theory of projection —each incompatible with the other and each beyond certain limits becoming inconsistent with the facts

The Theory of Identical Points

This theory starts from the truth that on both retinæ an impression on the upper half makes us perceive an object as below on the lower half as above



Fig 54

the horizon and on the right half an object to the left on the left half one to the right of the median line Thus each quadrant of one retina corresponds as a whole to the *similar* quadrant of the other and within two similar quad rants *al* and *ar* for example there should if the correspondence were consist

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word (*Be t age* p 344) What he calls the *K rnpunkt* of this space volume is the point we are momentarily fixating The absolute scale of the whole volume depends on the absolute distance at which this *K rnpunkt* is judged to lie from the person of the looker By an alteration of the localization of the *K npunkt* the *nne* relations f the seen space are nowise altered this space in its totality is as a f xed unit so to speak displaced with respect to the self of the lo ker (p 345) But what constitutes the lo alization of the *Kernpunkt* itself at any given time except Experience i e higher cerebral and intellectual processes involving memory Hering does not ek to def ne

Stumpf the other sensationalist writer who has best realized the d ff cult es of the prob lem thinks that the primitive sensation of distance must have an immed ate phys cal ante cedent either in the shape of an organic alteration accompany ng *the process of accommo dation* or else given directly in the spec f c energy of the optic n rve In contra t w th Hering however he thinks that it is *the abs lute distance of the pot fixated* wh ch is thus *prim tively mmed ately and physiologi ally g ven and not the elative distances* of other things about th s spot Th e h th nks are or ginally seen n what broadly speakin may be termed one plane with it Whethe th distanc of this plane con dered as a phenome non of our primitive sensib lity be an nva able datum o susc ptible of fluctuation he does not if I understand h m r ghtly undertak dogmatically to d cide but in lines to the former v ew Fo him th n as for Hering h gh r cer br l proc sses of associat on unde the name f Expe nc are the autho s of *fully on half part of the distance pe c ptions which we at any given time may have*

Hering s and Stumpf s theorie a e reported for the English reader by Mr Sully (*n M nd* III pp 172– 6) Mr Abb tt in his *S ght and T uch* (pp 96–98) g v s a th ry wh h is to me so obscure that I only refe th ead to ts pla e adding that it eems to make of dis tance a fixed functi n of et nal sensation a m d fied by f al adjustm nt B sid s th se three authors I am ignorant of any exc pt Panum wh may ha e att mpt d to d fine dis tance as in any degree an immediate sensati n And with them the di t sensational share is reduced to a very small propo t nal pa t in our complet d distance judgments.

Professor Lipps in h s singularly acute *P y h log ch Stud en* (p 69 ff) a gues as Fer

ently carried out be geometrica ... wh ch if impressed at the same time by light emitted from ... appear in the same direction to ... we look at the starry vault with ... laws of perspective show that under the circumstances the parallel ... coming from each star must impinge on points within either retina which are geometrically similar to each other The same result may be more artificially obtained If we take two exactly similar pictures smaller or at least no larger than those on an ordinary stereoscopic slide and if we look at them as stereoscopic slides are looked at that is at one with each eye (a median partition confining the view of either eye to the picture opposite it) we shall see but one flat picture all of whose parts appear sharp and single Identical points being impressed both eyes ee their object in the same direction and the two objects consequently coalesce into one

The same thing may be shown in still another way With fixed head con

ase f dista ce from th ey is th ey ... h d th f ... sp is seen betw t m t po t beh d ea h th th ea b th must ppe *besid* each oth r then the F th pace between tw bjects t be ... ditio is t is b lity possibl Th co clu pace in q esti will be ... *ble* O othe ... ditio is t ... sa is th t th gs ca p pe ly b see nly in wh t Lipps calls s f e, a d that kn w ... f th th d dim ns must eeds b co ptual n t sensati nal o ns lly intui

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by ...

dva tages re shooting with ... y closed.

J t so pair f pecta les h ld inch f m th y se m lik l g m dian glass. Th f culty f seeing st reoscop lides singl w th t an instrument f th tmo t tility t th st d t f phys l gical optics and pers ns w th t g yes ca ly q ire it. The nly difficulty lies in dissociating th degree f mmod ti f m th d gr of co vergence which t usually mpan es. If th right p t is f cussed by th ght eye, the left by the left ey the ptic axe must eith be p ll l g pon an im g ary point some distance behind th plane f th p t es, cc ding t th iz and distance part f the pict res. Th ccommodat h w er has t be mad f th plan f the pictures tself and near acc mmodatio w th far ff co g ce is som thing which the dinary use f our eyes ne er teaches us to ffect.

verge the eyes upon some conspicuous objective point behind a pane of glass then close either eye alternately and make a little ink mark on the glass covering the object as seen by the eye which is momentarily open On looking now with both eyes the ink marks will seem single and in the same direction as the objective point Conversely let the eyes converge on a single ink spot on the glass and then by alternate shutting of them let it be noted what objects behind the glass the spot covers to the right and left eye respectively Now with both eyes open both these objects and the spot will appear in the same place one or other of the three becoming more distinct according to the fluctuations of retinal attention[1]

Now what is the direction of this common place? The only way of defining the direction of an object is by *pointing to it* Most people if asked to look at an object over the horizontal edge of a sheet of paper which conceals their hand and arm and then to point their finger at it (raising the hand gradually so that at last a finger tip will appear above the sheet of paper) are found to place the finger not between either eye and the object but between the latter and the root of the nose and this whether both eyes or either alone be used Hering and Helmholtz express this by saying that we judge of the direction of objects as they would appear to an imaginary cyclopean eye situated between our two real eyes and with its optical axis bisecting the angle of convergence of the latter Our two retinæ act according to Hering as if they were superposed in the place of this imaginary double eye we see by the corresponding points of each situated far asunder as they really are just as we *should* see if they were superposed and could both be excited together

The judgment of objective singleness and that of identical direction seem to hang necessarily together And that of identical direction seems to carry with it the necessity of a common origin between the eyes or elsewhere from which all the directions felt may seem to be estimated This is why the cyclopean eye is really a fundamental part of the formulation of the theory of identical retinal points and why Hering the greatest champion of this theory lays so much stress upon it

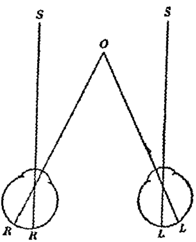


Fig 55

It is an immediate consequence of the law of identical projection of images on geometrically similar points that images which fall upon geometrically DISPARATE *points of the two retinæ should be projected in* DISPARATE *directions and that their objects should consequently appear in* TWO *places or* LOOK DOUBLE Take the parallel rays from a star falling upon two eyes which converge upon a near object O instead of being parallel as in the previously instanced case If SL and SR in Fig 55 be the parallel rays each of them will fall upon the nasal half of the retina which it strikes

[1] These two observations prove the law of identical direction only for objects which excite the foveæ or lie in the line of direct looking Observers skilled in indirect vision can however more or less easily verify the law for outlying retinal points.

But the two nasal halves are disparate geometrically *symmetrical* not geometrically *similar* The ima e on the left one will therefore appear as if lying in a direction leftward of the cyclopean eye s line of sight the image of the right one will appear far to the right of the same direction. The star will in short be seen double

Converse
double because
instead of one outer and one nasal half The position
re ersed from that of the previous case The right eye s image will now appear to the left the left eye s to t hl mages will be heteronymous

The same reasoning an
place with respect to the
images fall not on non similar retinal halves but on non similar parts of
halves Here of course the directions of projection will be less widely disparate
t will appear to lie less widely apart

sult the special treatises

Note now an important c If we take a stationary object and allow the eyes to vary their d
will show that there will be
espond ng retinal points
form r constitute the so-called horopter and their discovery has been attended with great mathematical difficulty Objects or parts of objects which lie in the eyes ho opter at any gi en time cannot appear double *Objects lying out of the horopter would seem if the theory of identical poi ts were strictly true neces sa ily and al ays to appear double*

He e comes the fir t great conflict of the identity theory with experience W re the theory true we ought all to have an intuitive knowled e of the horopte as the line of distinctest vision Objects placed elsewhere ought to seem if ht le t blurred And yet no li ng man makes any such dis-

memo r on b ocular on and the stereoscope showed that the disparateness of the po nts on which the two images of an object fall does not within certain l m ts ffect its seen s ngleness at all but rather the *distance* at which it shall ppear Wheatstone made an observation moreover which subsequently became the bone of much hot contentio in which he strove to show that not only m ght disparate mages fuse but images on corresponding or identical points m ht be seen double

lo g nterrallo America.

This is place t eport this ntr ersy b t f w b bli graph f es may be inappropria Wheatst ne wn experiment is i ection of his mem ir In f

I am unfortunately prevented by the weakness of my own eyes from experimenting enough to form a decided personal opinion on the matter It seems to me however that the balance of evidence is against the Wheatstonian interpretation and that disparate points may fuse without identical points for that reason ever giving double images The two questions Can we see single with disparate points? and ' Can we see double with identical points? although at the first blush they may appear as to Helmholtz they appear to be but two modes of expressing the same inquiry are in reality distinct The first may quite well be answered affirmatively and the second negatively

Add to this that the experiment quoted from Helmholtz above by no means always succeeds but that many individuals place their finger between the object and *one* of their eyes oftenest the right [1] finally observe that the identity theory with its cyclopean starting point for all lines of direction gives by itself no ground for the *distance* on any line at which an object shall appear and has to be helped out in this respect by subsidiary hypotheses which in the hands of Hering and others have become so complex as easily to fall a prey to critical attacks and it will soon seem as if *the law of identical seen directions by corresponding points although a simple formula for expressing concisely many fundamental phenomena is by no means an adequate account of the whole matter of retinal perception* [2]

The Projection theory

Does the theory of projection fare any better? This theory admits that each eye sees the object in a different direction from the other along the line namely passing from the object through the middle of the pupil to the retina A point directly fixated is thus seen on the optical axes of both eyes There is only one point however which these two optical axes have in common and that is the point to which they converge Everything directly looked at is seen at this point and is thus seen both single and at its proper distance It is easy to show the incompatibility of this theory with the theory of identity Take an objective point

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his interpretation see Helmboltz *Phys Opt* pp 737–39 Wundt *Pl ys ol P ycl ol* 2d ed p 144 Nagel *S hen m t za Augen* pp 78–82 Against Whe tst ne e Volkmann in *A h f Ophtl* v pp –74 and *Unte suclu gen* p 266 Hering *B t ag u Pl y i l g* pp 29–45 also in Hermann s *Hdb h d Physiol* vol III pt 1 p 435 Aubert *Phy i ol g d V tchaut* p 3 2 Sch n in *A cl v f Opl tl al* xxxv 1 pp 56–65 and Donders, *ib d* XIII 1 p 15 and not

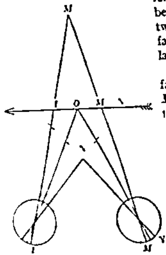
When v e see the finger the wh le t m we usually put t in th l n j in ng obj t and left eye if it be the left f nger join ng bj ct and r ght eye if t be the r ht finge Micro scop sts marksm n r persons one f whose eyes is much better than the other almost always refer d ect ons to a singl ve as may be seen by the pos ti n of th shadow on their face when they point at a candl flame

[2] Prof so Jo ph Le C nt v h bch v s st ongly in th id ntity theory h s mb d ed the latt in a pair of laws f the elat on b tw en p ti ns e n single and d uble near or far on the on hand and c nv g nces and r tinal mp ssi ns on the oth which though complicated seems to me by far the best desc pt e f rmulat n yet mad of the normal facts of vision His account s easily acc bl t the r ad n his volum *S ght* in the International Scientific Ser es bk II chap 3 so I say no m about it n w ex pt that it does not solve any of the difficult es we are noting in th dentity theory n r ac ount for the other fluctuating perceptions of which we go n to tr at

(like O in Fig. 55 when the star is looked at) ca_ting its images R and L on ge – nrall dissimilar parts of the two retinæ and affecting the outer half of ... 1 to appear double whilst on
ea
tl
g r
neither nearer nor farther than its poin

E ery point n the field of view ougl t u sforrly al d to appear single entirel of the eyes for from every point of pace ... the two retinæ and at the intersection of these lines or just where the point is, there according to the theory it should appear *The objection to this theory is thus precisely the re-erse of the object on to the identity theory If the latter ruled we ought to see most things double all the t me If the projection theory ruled we ou ht never to see anyth ng double As a matter of fact we get too few do ble ima es for the identity-theory and too many for the projection theory*

The partisans of the projection theory beginning with Aguilonius have al wa s explained double images as the result of an erroneous judgment of the *distance* of the object the images of the latter being projected by the imagination along the two lines of visible direction either nearer or farther than the point of intersection of the latter A diagram will make this clear



Let O be the point looked at M an object farther and \ an object nearer than it Then M nd \ will send the lines of visible direc
1
—
the plane of the arrow or in two places at \ and at \" If M be jud ed as near as O it must for the same reason form two images at M and M

It is as a matter of fact true that we often misjud e the distance in the way alleged If the reader will hold his forefin ers one beyond the other in the median line and fixate them alter nately he will see the one not looked at dou ble and he will also notice that it appears nearer to the plane of the one looked at whichever the latter may be than it really is. Its chan es of apparent size as t e con ergence of the eyes alter also prove the chan e of apparent distance The distance at which the axes co ver e seems in fact to exert a sort of attrac tio pon objects situated elsewhere. Being the distance of which we are most ac tely sens ble it invades, so to speak, the whole field of our perception. If tw half-d llars be laid on the table an inch or two apart, and the eyes fixate steadil the point of a pen held in the median line at varyin distances between the coins and the face there will come a distance at which the pen stands between the l ft half-dollar and the r ght eye and the right half-dollar and the left eye The two half-dollars will then coalesce into one and this one will

show its apparent approach to the pen point by seeming suddenly much reduced in size[1]

Yet in spite of this tendency to inaccuracy we are never actually mistaken about the half dollar being behind the pen point It may not seem far enough off but still it is farther than the point In general it may be said that where the objects are known to us no such illusion of distance occurs in *any one* as the theory would require And in some observers Hering for example it seems *hardly to occur at all* If I look into infinite distance and get my finger in double images they do not seem infinitely far off To make objects at different distances seem equidistant careful precautions must be taken to have them alike in appearance and to exclude all outward reasons for ascribing to the one a different location from that ascribed to the other Thus Donders tries to prove the law of projection by taking two similar electric sparks one behind the other on a dark ground one seen double or an iron rod placed so near to the eyes that its double images seem *as broad as that of a fixated stove pipe the top and bottom of the* objects being cut off by screens so as to prevent all suggestions of perspective etc The three objects in each experiment seem in the same plane[2]

Add to this the impossibility recognized by *all* observers of ever seeing double with the foveæ and the fact that authorities as able as those quoted in the note on Wheatstone s observations deny that they can see double then with identical points and we are forced to conclude that *the projection theory like its predecessor breaks down Neither formulates exactly or exhaustively a law for all our perceptions*

Ambiguity of Retinal Impressions

What does each theory try to do? To make of seen location a fixed function of retinal impression Other facts may be brought forward to show how far from

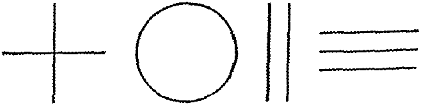


FIG 57

fixed are the perceptive functions of retinal impressions We alluded a while ago to the extraordinary ambiguity of the retinal image as a revealer of magnitude Produce an after image of the sun and look at your finger tip it will be smaller than your nail Project it on the table and it will be as big as a strawberry on the wall as large as a plate on yonder mountain bigger than a house And yet it is an unchanged retinal impression Prepare a sheet with the figures shown in Fig 57 strongly marked upon it and get by direct fixation a distinct after image of each

[1] Naturally it takes a smaller object at a less distance to cover by its image a constant amount of retinal surface

[2] *Archiv f Ophthal* vol xvii pt ii pp 44 46 (1871)

ner left hand part of the wall

Project the af
it will appear a
The circle simil y

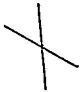


Fig. 58

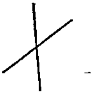


Fig. 59

two parallel lines be projected upon the ceiling or floor far in front, the farther ends will diverge and if the three parallel lines be thrown on the same surfaces, the upper pair will seem farther apart than the lower

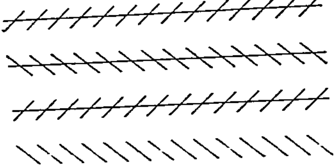


Fig. 60

Adding certain lines to others has the same distorting effect. In what is known as Zollner s pattern (Fig. 60) the long parallels tip towards each other the mo-

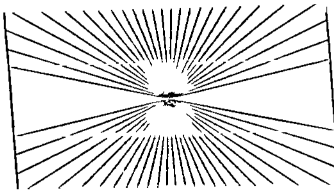


Fig. 61

ment we draw the short slanting lines over them yet their retinal images are the same as they always were A similar distortion of parallels appears in Fig 61

Drawing a square inside the circle (Fig 62) gives to the outline of the latter an indented appearance where the square s corners touch it Drawing the radii



Fig 62

inside of one of the right angles in the same figure makes it seem larger than the other In Fig 63 the retinal image of the space between the extreme dots is in

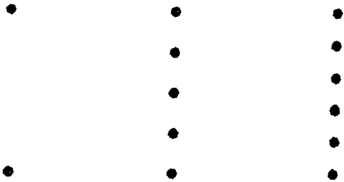


Fig 63

all three lines the same yet it seems much larger the moment it is filled up with other dots

In the stereoscope certain pairs of lines which look single under ordinary circumstances immediately seem double when we add certain other lines to them

Ambiguous Import of Eye movements

These facts show the indeterminateness of the space import of various *retinal impressions* Take now the *eye s movements* and we find a similar vacillation When we follow a moving object with our gaze the motion is voluntary when our eyes oscillate to and fro after we have made ourselves dizzy by spinning around it is reflex and when the eyeball is pushed with the finger it is passive Now in all three of these cases we get a feeling from the movement as it effects itself But the objective perceptions to which the feeling assists us are by no means the same In the first case we may see a stationary field of view with one moving object in it in the second the total field swimming more or less steadily in one direction in the third a sudden jump or twist of the same total field

The feelings of convergence of the eyeballs permit of the same ambiguous interpretation When objects are near we converge strongly upon them in order to see them when far we set our optic axes parallel But the exact degree of con

[1] A W Volkmann *Untersuchungen* p 253

vergence fails to be felt or rather being felt it fails to tell us the absolute distance of the object we are regardin Wheatstone arranged his tereoscope in such a way that the size of the retinal images might chan e without the convergence altern or conversely the convergence might change without the retinal image altering. Under these circumstances he says[1] the object seemed to approach or recede in the first case without altering its size in the second to change its size without altering its distance—just the reverse of what might have been expected Wheatstone adds however that fixing the attention converted each of these perceptions int no te The same perplexity occurs in loo in through prismatic glasses v decide whether the object has come and our judgment vacillates in the eyes diverge and the object will none the less appear at a finite distance when we look through the stereoscope the picture seems at no determinate distance These and other facts have led Helmholtz to deny that the feeling of convergence has any very exact value as a distance-measurer

With *the feel gs of accommodat on* it is very much the same Donders has shown that the apparent magnifying power of spectacles of moderate convexity hardl depends at all upon their enlargement of the retinal image but rather on the elaxation they permit of the muscle of accommodation This suggests an object farther off and consequently a much larger one since its retinal size rather increases than diminishes But in this case the same vacillation of judgment as in the previously mentioned case of convergence takes place The recession made the object seem larger but the apparent growth in size of the object now makes t look as if it came neare instead of receding. The effect thus contradicts its own cause. Everyone is conscious on first putting on a pair of pectacles of a doubt whether the field of view draws near or retreats.

There is till *another decept on occurrin n persons who ha e had one eye muscle s dd nly paralyzed* This deception has led Wundt to affirm that the eyeball feeling proper the incomin sensation of effected rotation tells us only of the direction of our eye-movements but not of their whole extent. For this reason and because not only Wundt but many other authors think the phenomena in these partial paralyses dem nstrate the existence of a feeling of innervation a feeling of the outgoing nervous current opposed to every afferent sensat on whatever it seems proper to note the facts with a certain degree of d tail

Suppose a man wakes up some morning with the external rectus muscle of his right eye half paralyzed what will be the result He will be enabled only with

[1] *Philosophical T ansactions* 85 p. 4.

Physiol Optik pp. 649–62. Later this thor is led t value co vergence m re highly *A k f (Anat u.) Physiol.* (8 8) p. 3

[illegible] *A mm ulic* and *R* actio (New S denham Soc. transl., London, 364 p. 5

These trange co tradictions have been called by A bert "secondary" deceptions f Judgment. See *Grundz. d Physiologisch Optik* (Leipzig, 8 6) pp 60 6 5 6 7 One f the best examples f them is the small size f th moo as first seen through telesc pe. It is larger and brighter so w see its details mor distinctly and judge it nearer B t because judge t so much nearer w think it must be gr wn smaller *Cf* Charpentier in *J hre bericht* x, p. 430. *Revue philo phique* III, 9, p. a.

great effort to rotate the eye so as to look at objects lying far off to the right. Something in the effort he makes will make him feel as if the object lay much farther to the right than it really is If the left and sound eye be closed and he be asked to touch rapidly with his finger an object situated towards his right he will point the finger to the right of it The current explanation of the something in the effort which causes this deception is that it is the sensation of the outgoing discharge from the nervous centres the feeling of innervation to use Wundt s expression requisite for bringing the open eye with its weakened muscle to bear upon the object to be touched If that object be situated 20 degrees *to the right* the patient has now to innervate as powerfully to turn the eye those 20 degrees as formerly he did to turn the eye 30 degrees He consequently believes as before that he *has* turned it 30 degrees until by a newly acquired custom he learns the altered spatial import of all the discharges his brain makes into his right abducens nerve The feeling of innervation maintained to exist by this and other observations plays an immense part in the space theories of certain philosophers especially Wundt I shall elsewhere try to show that the observations by no means warrant the conclusions drawn from them and that the feeling in question is probably a wholly fictitious entity[1] Meanwhile it suffices to point out that even those who set most store by it are compelled by the readiness with which the translocation of the field of view becomes corrected and further errors avoided to admit that the precise space import of *the supposed sensation of outgoing energy is as ambiguous and indeterminate as that of any other of the eye feelings we have considered hitherto*

I have now given what no one will call an understatement of the facts and arguments by which it is sought to banish the credit of directly revealing space from each and every kind of eye sensation taken by itself The reader will confess that they make a very plausible show and most likely wonder whether my own theory of the matter can rally from their damaging evidence But the case is far from being hopeless and the introduction of a discrimination hitherto unmade will if I mistake not easily vindicate the view adopted in these pages whilst at the same time it makes ungrudging allowance for all the ambiguity and illusion on which so much stress is laid by the advocates of the intellectualist theory

The Choice of the Visual Reality

We *have* native and fixed optical space sensations *but experience leads us to select certain ones from among them to be the exclusive bearers of reality the rest become mere signs and suggesters of these* The factor of *selection* on which we have already laid so much stress here as elsewhere is the solving word of the enigma If Helmholtz Wundt and the rest *with an ambiguous retinal sensation* before them meaning now one size and distance and now another had not contented themselves with merely saying —The size and distance are not this sensation they are something beyond it which it merely calls up and whose own birthplace is afar—in synthesis (Wundt) or in experience (Helmholtz) as the case may be if they had gone on definitely to ask and definitely to answer

[1] See Chapter XXIV

the question, "What are the size and distance in their proper selves?" they would not only have escaped the present deplorable vagueness of their space-theories, but they would have seen that the objective spatial attributes 'signified' are simply and solely *certain other optical sensations now absent* but which the present sensations suggest.

What, for example, is the slant-legged cross which we think we see on the wall when we project the rectangular after-image high up towards our right or left (Figs. 58 and 59)? Is it not in very sooth a retinal sensation itself? An imagined sensation, not a felt one, it is true; but none the less essentially and originally sensational or retinal for that,—the sensation, namely, which we should receive if a real slant-legged cross stood on the wall *in front of us* and threw its image on our eye. That image is not the one our retina now holds. Our retina now holds the image which a cross of square shape throws when in front, but which a cross of the slant-legged pattern *would* throw provided it were actually on the wall in the distant place at which we look. Call this actual retinal image the 'square' image. The square image is then one of the innumerable images the slant-legged cross can throw. Why should another one, and that an absent one, of those innumerable images be picked out to represent exclusively the slant-legged cross's true shape? Why should that absent and imagined slant-legged image displace the present and felt square image from our mind? Why, when the objective cross gives us so many shapes as it varies its position, should we think we feel the true shape only when the cross is directly in front? And when that question is answered, how can the absent and represented feeling of a slant-legged figure so successfully intrude itself into the place of a presented square one?

Before answering either question, let us be doubly sure about our facts, and see how true it is that *in our dealings with objects we always do pick out one of the visual images they yield to constitute the real form or size.*

The matter of size has been already touched upon, so that no more need be said of it here. As regards shape, almost all the retinal shapes that objects throw are perspective distortions. Square table-tops constantly present two acute and two obtuse angles; circles drawn on our wallpapers, our carpets, or on sheets of paper, usually show like ellipses; parallels approach as they recede; human bodies are foreshortened; and the transitions from one to another of these altering forms are infinite and continual. Out of the flux, however, one phase always stands prominent. It is the form the object has when we see it easiest and best: and that is when our eyes and the object both are in what may be called *the normal position*. In this position our head is upright and our optic axes either parallel or symmetrically convergent; the plane of the object is perpendicular to the visual plane; and if the object is one containing many lines, it is turned so as to make them, as far as possible, either parallel or perpendicular to the visual plane. In this situation it is that we compare all shapes with each other; here every exact measurement and decision is made.[1]

[1] The only exception seems to be when we expressly wish to abstract from particulars, and to judge of the general effect. Witness ladies trying on new dresses with their heads inclined and their eyes askance, or painters in the same attitude judging of the 'values' in their pictures.

It is very easy to see why the normal situation should have this extraordinary pre eminence First it is the position in which we easiest hold anything we are examining in our hands second it is a turning point between all right and all left hand perspective views of a given object third it is the only position in which symmetrical figures seem symmetrical and equal angles seem equal fourth it is often that starting point of movements from which the eye is least troubled by axial rotations by which *superposition*[1] of the retinal images of different lines and different parts of the same line is easiest produced and consequently by which the eye can make the best comparative measurements in its sweeps All these merits single the normal position out to be chosen No other point of view offers so many æsthetic and practical advantages Here we believe we see the object as it *is* elsewhere only as it seems Experience and custom soon teach us however that the seeming appearance passes into the real one by continuous gradations They teach us moreover that seeming and being may be strangely interchanged Now a real circle may slide into a seeming ellipse now an ellipse may by sliding in the same direction become a seeming circle now a rectangular cross grows slant legged now a slant legged one grows rectangular

Almost any form in oblique vision may be thus a derivative of almost any other in primary vision and we must learn when we get one of the former appearances to translate it into the appropriate one of the latter class we must learn of what optical reality it is one of the optical signs Having learned this we do but obey that law of economy or simplification which dominates our whole psychic life when we attend exclusively to the reality and ignore as much as our consciousness will let us the sign by which we came to apprehend it The signs of each probable real thing being multiple and the thing itself one and fixed we gain the same mental relief by abandoning the former for the latter that we do when we abandon mental images with all their fluctuating characters for the definite and unchangeable *names* which they suggest The selection of the several normal appearances from out of the jungle of our optical experiences to serve as the real sights of which we shall think is psychologically a parallel phenomenon to the habit of thinking in words and has a like use Both are substitutions of terms few and fixed for terms manifold and vague

Sensations Which We Ignore

This service of sensations as mere signs to be ignored when they have evoked the other sensations which are their significates was noticed first by Berkeley and remarked in many passages as the following

> Signs being little considered in themselves or for their own sake but only in their relative capacity and for the sake of those things whereof they are signs it comes to pass that the mind overlooks them so as to carry its attention immediately on to the things signified which in truth and strictness are not *seen* but only *suggested* and *apprehended* by means of the proper objects of sight which alone are seen (*Divine Visual Language* § 12)

Berkeley of course erred in supposing that the thing suggested was not even

[1] The importance of Superposition will appear later on

originally an object of sight as the sign now is which calls it up Reid expressed Berkeley s principle in yet clearer language

> The visible appearances of objects are intended by nature only as signs or indications and the mind ... signified without making the least reflection upon the ... mind has acquired ... signs) For they no ... ceeds and engrosses ... are conscious of the ... and so familiar tha ... themsel es, either in the memory or imagination (*Inquiry* chap v §§ ...)

If we review the facts we shall find every grade of non attention between the extreme form of overlooking mentioned by Reid (or forms even more extreme still) and complete conscious perception of the sensation present Sometimes it is literally impossible to become aware of the latter Sometimes a little artifice or effort easily leads us to discern it to ether or in alternation with the object t reveals Sometimes the present sensation is held to *be* the object or to reproduce ts features in undistorted shape and *then* of course it receives the mind s full glare

The deepest inattent on is to subjective optical sensations str ctly so called or those which are not signs of outer objects at all Helmholtz s treatment of these phenomena *m scæ vol tantes* negative after ima es double images etc is ery satisfactory He says

> We only attend with any ease and exactness to our sensati ns in s f r forth as they can be ... d f the kn l dg of utwa d things and we e accustomed t glect a ... ternal w l ... p uc are ... Alth ugh t might em th t othi g sho ld be easier than to be co sc ous of ne s ... men ce n ertheless hows that often enough either a pecial tal ...
>
> ... way mil rly by me th existence of umm tio tones in acoustics In the majo ity f case a cident s what first led observers whose attention was especially exercised ubjecti e phenomena t di co er this one o that only where the s bjecti e ppearan es a e so intense th t they int fere w th th percepti n of bjects e they u ed by all men like. But if they have once been discover d t is for the most part ea. f s b q ent ob ervers who pl e themsel es in p ope c ditions and bend thei ttentio in the right di ecti to pe cei e them But in m y cases—for example th phenom na of the blind spot in th discriminatio of o er tones a d omb nat o t es from th gr und to e of musical sounds tc —such a strain of th attent n is equired ev n with appr priate instrumental aids that most person fail Th ery aft images f bright bjects are by m t men percei d only under exceptionally fa rable conditi ns and t takes teady practice t se the fainter images f th s kind. It is a commonly recurring experience that persons smitten th some ye-disease whi h impairs v o uddenly ema k fo th first time the *muscæ volitantes* which all thr ugh life their v treous humor has contained, but which they w firmly believe to ha e arisen since thei malady the truth being that the latt has only made them more bservant f all their usual sensations.

> There are also cases where one eye has gradually grown blind and the patient lived for an indefinite time without knowing it until through the accidental closure of the healthy eye alone the blindness of the other was brought to attention
>
> Most people when first made aware of binocular double images are uncommonly astonished that they should never have noticed them before although all through their life they had been in the habit of seeing singly only those few objects which were about equally distant from the point of fixation and the rest those nearer and farther which constitute the great majority had always been double
>
> We must then *learn* to turn our attention to our particular sensations and we learn this commonly only for such sensations as are means of cognition of the outer world Only so far as they serve this end have our sensations any importance for us in ordinary life Subjective feelings are mostly interesting only to scientific investigators were they remarked in the ordinary use of the senses they could only cause disturbance Whilst therefore we reach an extraordinary degree of firmness and security in objective observation we not only do not reach this where subjective phenomena are concerned but we actually attain in a high degree the faculty of overlooking these altogether and keeping ourselves independent of their influence in judging of objects even in cases where their strength might lead them easily to attract our attention (*Physiol Optik* pp 431–32)

Even where the sensation is not merely subjective as in the cases of which Helmholtz speaks but is a sign of something outward we are also liable as Reid says to overlook its intrinsic quality and attend exclusively to the image of the thing it suggests But here everyone *can* easily notice the sensation itself if he will Usually we see a sheet of paper as uniformly white although a part of it may be in shadow But we can in an instant if we please notice the shadow as local color A man walking towards us does not usually seem to alter his size but we can by setting our attention in a peculiar way make him appear to do so The whole education of the artist consists in his learning to see the presented signs as well as the represented things No matter what the field of view *means* he sees it also as it *feels*—that is as a collection of patches of color bounded by lines—the whole forming an optical diagram of whose intrinsic proportions one who is not an artist has hardly a conscious inkling The ordinary man s attention passes *over* them to their import the artist s turns back and dwells *upon* them for their own sake Don t draw the thing as it *is* but as it *looks!* is the endless advice of every teacher to his pupil forgetting that what it is is what it would also look provided it were placed in what we have called the normal situation for vision In this situation the sensation as sign and the sensation as object coalesce into one and there is no contrast between them

Sensations Which Seem Suppressed

But a great difficulty has been made of certain peculiar cases which we must now turn to consider They are *cases in which a present sensation whose existence is supposed to be proved by its outward conditions being there seems absolutely suppressed or changed by the image of the thing it suggests*

This matter carries us back to what was said on p 594 The passage there quoted from Helmholtz refers to these cases He thinks they conclusively disprove the original and intrinsic spatiality of any of our retinal sensations for if

such a one actually present, had an immanent and essential space-determination of its own that might well be added to and overlaid or even momentarily eclipsed by suggestions of its signification, but how could it possibly be altered or completely *suppressed* thereby? Of actually present sensations, he says being *suppressed* by suggestions of experience—

We have not a single well attested example. In all those illusions which are provoked by *sensations* in the absence of their usually exciting objects the mistake never vanishes by the better understanding of the object really present and by insight into the cause of deception. Phosphenes provoked by pressure on the eyeball by traction on the entrance of the optic nerve, after images, etc. remain projected into their apparent place in the field of vision, just as the image projected from a mirror's surface continues to be seen *behind* the mirror although we *know* that to all these appearances no outward reality corresponds. True enough, we can remove our attention, and keep it removed, from sensations that have no reference to the outer world, those e.g. of the weaker after images and of entoptic objects etc. But what would become of our perceptions at all if we had the power not only of ignoring but of *transforming into their opposite* any part of them that differed from that outward experience the image of which, as that of a present reality accompanies them in the mind

And again

On the analogy of all other experience, we should expect that the conquered feelings would persist to our perception even if only in the shape of recognized illusions. But this is not the case. One does not see how the assumption of originally spatial sensations can explain our optical conditions, when in the last resort those who believe in these very sensations find themselves obliged to assume that they are *overcome* by our better judgment, based on experience.

These words coming from such a quarter necessarily carry great weight. But the authority even of a Helmholtz ought not to shake one's critical composure. And the moment one abandons abstract generalities and comes to close quarters with the particulars I think one easily sees that no such conclusions as those we have quoted follow from the latter But profitably to conduct the discussion we ***must divide the alleged instances into groups***

[illegible] in my opinion Hering has definitively proved that when one color is laid beside another it modifies the sensation of the latter not by virtue of any mere mental suggestion as Helmholtz would have it, but by actually exciting a new nerve-process to which the modified feeling of color immediately corresponds. The explanation is physiological not psychological The transformation of the original color by the inducing color is due to the disappearance of the physiological conditions under which the first color was produced and to the production under the new conditions of a genuine new sensation with which the suggestions of experience have naught to do

Physiol Optik p. 8 7

That processes in the visual apparatus propagate themselves laterally if one may so express it is also shown by the *phenomena of contrast which occur after looking upon motions* of various kinds Here are a few examples If over the rail of a moving vessel we look at the water rushing along the side and then transfer our gaze to the deck a band of planks will appear to us, moving in the opposite direction to that in which a moment previously we had been seeing the water move whilst on either side of this band another band of planks will move as the water did Looking at a waterfall or at the road from out of a car window in a moving train produces the same illusion which may be easily verified in the laboratory by a simple piece of apparatus A board with a window five or six inches wide and of any convenient length is supported upright on two feet On the back side of the board above and below the window are two rollers one of which is provided with a crank An endless band of any figured stuff is passed over these rollers (one of which can be so adjusted on its bearings as to keep the stuff always taut and not liable to slip) and the surface of the front board is also covered with stuff or paper of a nature to catch the eye Turning the crank now sets the central band in continuous motion whilst the margins of the field really remain at rest but after a while appear moving in the con

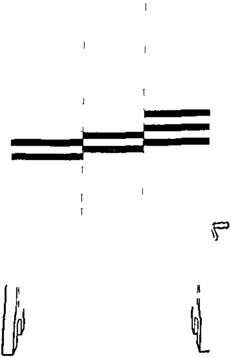


Fig 64



Fig 65

A disk with an Archimedean spiral drawn upon it whirled round on an ordinary rotating machine produces still more startling effects

If the revolution is in the direction in which the spiral line approaches the centre of the disk the entire surface of the latter seems to expand during revolution and to contract after it has ceased and *vice versa* if the movement of revolution is in the opposite direction If in the former case the eyes of the observers are turned from the rotating disk towards any familiar object—

e.g. the face of a friend—the latter seems t contract or recede in a somewhat stnk... ma..ner and to expand r approach after the oppo..te motion f the spiral.

An elementary form of these motor illu m to be the one described by Helmholtz on pp 568–571 of his *Optik* vision alon an acute angle towards a s Thus in Fi 66 Let AB be a line drawn on paper

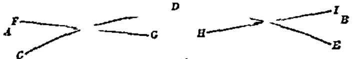


FIG. 66

this line by the point of a compass steadily followed by the eye as it moves As the compass-point passes from C to D the line appears to move downwards as t passes from D to E the line appears to mo e upwards at the same time the whole line seems to incline itself in the direction FG during the first half of the compass s movement and in the direction HI during its last half the change from one inclination to another bein quite distinct as the compass point passes over D

wh h we draw a pencil-point appears to be animated by a

and seems to tak

If we draw the point of a pencil through Zöllner s pattern (F g 60 p 603) and fol

lar p

tions.

people

same is the case with many other illusions

Now all these facts taken together seem to show—vaguely it is true, but cer tainl —*that prese t excitements a d after-effects of former excitements may alt the esult of processes occurring simultaneously at a d stance from them in th t na* or other portions of the apparatus for optical sensat on. In the cases la.t con. dered the moving eye as it sweeps the fovea over certain parts of the

or *ntellectu..l not sens..tio ..l that they are secondary not primary mental*

Bowditch and Hall in *Journal f Physiology* I. iii, p. 99. Helmh tz tries t explain this phenomenon by unc..scious rotati ns f the ey ball But movements f th eyeball can el explain uch ppearances f mo ements as are th same ver the wh le fi ld. In be ..ndowed board one part f the field seems to mo e in ne way another part in another The same is true when we turn from the spiral t look t the wall—th cent f th field alone w ..s ontracts, the margin does th reverse remains t rest. Mach and Dvorak ha be ..ully proved the impossibilit f eye-rotations in this case (Sit ungsber d. Wiener Akad ol. LXI) See also Bowditch and Hall paper as bove, p. 300.

facts The distorted figure is said to be one which the mind is led to *imagine* by falsely drawing an unconscious inference from certain premises of which it is not distinctly aware And the imagined figure is supposed to be strong enough to suppress the perception of whatever real sensations there may be But Helm

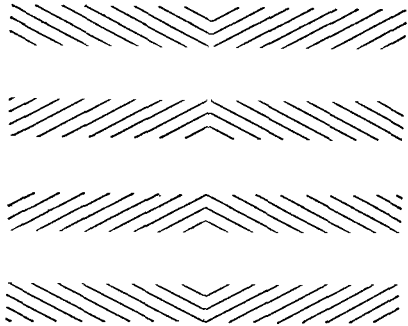


FIG 67

holtz Wundt Delbœuf Zollner and all the advocates of unconscious inference are at variance with each other when it comes to the question of what these unconscious premises and inferences may be

That small angles look proportionally larger than larger ones is in brief the fundamental illusion to which almost all authors would reduce the peculiarity of Fig 67 as of Figs 60 61 62 (pp 603 604) This peculiarity of small angles is treated by Wundt as the case of a filled space seeming larger than an empty one, as in Fig 68 and this according to both Delbœuf and Wundt is owing to



FIG 68

the fact that more muscular innervation is needed for the eye to traverse a filled space than an empty one because the points and lines in the filled space inevitably arrest and constrain the eye and this makes us feel as if it were doing more work i e traversing a longer distance When however we recollect that muscular movements are positively proved to have *no* share in the waterfall and revolving spiral illusions and that it is hard to see how Wundt s and Delbœuf s particular form of muscle explanation can possibly apply to the compass-point illusion considered a moment ago we must conclude that these writers

[1] *Bulletins de l Acad belgique* XXI p 2 *Revue philosophique* VI, pp 223–25 *Physiologische Psychologie* 2d ed p 103 *Cf* Münsterberg s views *Beiträge* pt 2 p 174

have probably exaggerated to say the least the reach of their muscle-explanation in the case of the subdivided angles and lines Never do we get such strong muscular feelings as when against the course of nature we oblige our eyes to be still but fixing the eyes on one point of the figure so far from making that part of the latter seem larger dispels in most persons the illusion of these diagrams

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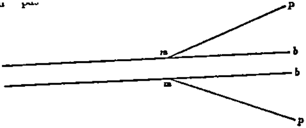


FIG 69

wh says that by it small paces ought to appear to us smaller and not larger th they really are Helmholtz might have retorted (had not the retort been as fatal to the uniform f h own princ ple as to Wundt s) that if the muscle-

xplanat on were tr
the skin. We saw o
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ur feeling of size is determined differently in the skin and in the retina even wh n the objective conditions are the same Hering's explanation of Zollner s figure is to be found in Hermann s *Ha db d Phys ologie* III 1 p 579 Lipps

r ct on The illusion is apparent in the shape of a seeming approach of the ends

Physiol Opt k pp. 562– *Physiol. P ych* pp. 7 08.
G nd atsache de Seelenuebens pp 5 6–30.

b b of the two main lines This to my mind would be a more satisfactory explanation of this class of illusions than any of those given by previous authors were it not again for what happens in the skin

Considering all the circumstances I feel justified in discarding his entire batch of illusions as irrelevant to our present inquiry Whatever they may prove

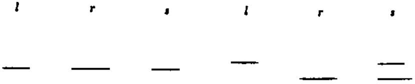


FIG 70

they do not prove that our visual percepts of form and movement may not be sensations strictly so called They much more probably fall into line with the *phenomena of irradiation and of color contrast and with Vierordt s primitive* illusions of movement They show us if anything a realm of sensations in which our habitual experience has not yet made traces and which persist in spite of our better knowledge *un*suggestive of those other space sensations which we all the time know from extrinsic evidence to constitute the real space determinations of the diagram Very likely if these sensations were as frequent and as

[illegible]
appear like that of the size of a tooth socket when the tooth has been out a week

(*b*) *Another batch of cases which we may discard is that of double images* A thoroughgoing anti sensationalist ought to deny all native tendency to see *double images when disparate retinal points are stimulated because he should* say most people never get them but *see* all things single which experience has led them to believe to *be* single Can a doubleness so easily neutralized by our knowledge ever be a datum of sensation at all? such an anti sensationalist might ask

To which the answer is that it *is* a datum of sensation but a datum which like many other data must first be *discriminated* As a rule no sensible qualities are discriminated without a motive [1] And those that later we learn to discriminate were originally felt confused As well pretend that a voice or an odor which we have learned to pick out is no sensation now One may easily acquire skill in discriminating double images though as Hering somewhere says it is an art of which one cannot become master in one year or in two For masters like Hering himself or Le Conte the ordinary stereoscopic diagrams are of little use Instead of combining intc
other with their doubled lines
which the addition of secondary
the primary lines double The effect is analogous to that shown in the cases

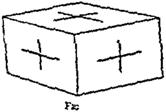
[1] *Cf supra* p 326 ff

which we despatched a moment ago where given lines have their space-value changed by the addition of new lines without our bein able to say why except that a certain mutual adhesion of the lines and modification of the resultant feeling takes place by psychophysiological laws. Thus, if in Fig o *l* and *r* be crossed by an horizontal line at the same level and viewed tereoscopically they appear as a single pair of lines s in space. But if the horizontal be at different levels, as in *l' r'* three lines appear as in *s*

Let us then say no more about double images. All that the facts prove is what Volkmann says that although there may be sets of retinal fibres so organized as to give an impression of two separate spots yet the excitement of other retinal fibres may inhibit the effect of the first excitement, and prevent us from actually making the discrimination. Still farther retinal processes may however bring the doubleness to the eye of attention and once there, it is as genuine a sensation as any that our life affords.

(*c*) *These gro s of Illusions be* *n* *clim nated* either as cases of defective discrimination, or as changes of one space-sensation into another when the total retinal process changes *there* *emai but two othe groups to ... us* The first is that of the after images distorted by projection on to oblique planes the second relates to the instability of our judgments of relative distance and size by the e e and includes especiall what are known as pseudoscopic illusions.

The phenomena of the first group were described on page 60 A W Volkmann has studied them with his accustomed clearness and care. Even an imaginarily inclined wall in a picture will if an after image be thrown upon it distort the shape thereof and make us *see* a form of which our after image would be the natural projection on the retina, were that form laid upon the wall Thus a signboard is painted in perspective on a screen and the eye after steadily looking at a rectangular cross, is turned to the painted signboard. The after image appears as an oblique-legged cross upon the signboard. It is the converse phenomenon of a perspective drawing like Fig 1 in which really oblique-legged figures are seen as rectangular crosses.



Fig

The instable judgments of relative distance and size were also mentioned on pp 60 -03 Whatever the size may be of the retinal image which an object makes, the object is seen as of its own normal size A man moving towards us is not sensibly perceived to grow for example and my tumbler of which a single ... may ... than conceal him from my view is nevertheless seen as a much ... object than the man. As for distances, t is often possible to make the

See *Archiv f Ophthal* 1 (59) where many more examples are given.

Unt rsuchung u. p. 50 see also p. 32.

I pass over certain discussions about double images, drawn from the perceptions of few ... (e g by Schweigger *Klin Unter such über das Schielen* Berlin, 85 by J ... *d'oculistique* xxxiv p. 7) because the facts are exceptional t best and very ... interpretation In f vo of the sensationalistic or nativistic view of the such case, see the important paper by Von Kries, in *Archiv f Ophthal*, xxiv 4, p. 1 7 *Physiologische Untersuchungen* im *Gebiete der Optik*

farther part of an object seem near and the nearer part far. A human profile in intaglio looked at steadily with one eye, or even both, soon appears irresistibly as a bas relief. The inside of a common pasteboard mask painted like the outside and viewed with one eye in a direct light also looks convex instead of hollow. So strong is the illusion after long fixation that a friend who painted such a mask for me told me it soon became difficult to see how to apply the brush. Bend a visiting card across the middle so that its halves form an angle of 90° more or less, set it upright on the table as in Fig. 72, and view it with one eye. You can make it appear

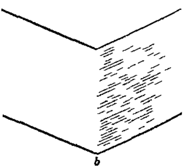


FIG. 72

either as if it opened towards you or away from you. In the former case the angle *ab* lies upon the table, *b* being nearer to you than *a*; in the latter case *ab* seems vertical to the table—as indeed it really is—with *a* nearer to you than b.[1] Again look, with either one or two eyes, at the opening of a wine-glass or tumbler (Fig. 73) held either above or below the eye's level. The retinal image of the opening is an oval, but we can see the oval in either of two ways—as if it were the perspective view of a circle whose edge *b* were farther from us than its edge *a* (in which case we should seem to be looking down on the circle), or as if its edge *a* were the more distant edge (in which case we should be looking up at it through the *b* side of the glass). As the manner of seeing the edge changes, the glass itself alters its form in space and looks straight or seems bent towards or from the eye,[2] according as the latter is placed beneath or above it.

Plane diagrams also can be conceived as solids, and that in more than one way. Figs. 74, 75, 76, for example, are ambiguous perspective projections, and may each of them remind us of two different natural objects. Whichever of these objects we conceive clearly at the moment of looking at the figure we seem to *see* in all its solidity before us. A little practice will enable us to flap the figures, so to speak, backwards and forwards from one object to the other at will. We need only attend to one of the angles represented and imagine it either solid or hollow—pulled towards us out of the plane of the paper or pushed back behind the same—and the whole figure obeys the cue and is instantaneously transformed beneath our gaze.[3]

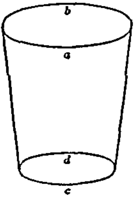


FIG. 73

The peculiarity of all these cases is the ambiguity of the perception to which the fixed retinal impression gives rise. With our retina excited in exactly the same way, whether by after image, mask, or diagram, we *see* now this object and now that, as if the retinal image *per se* had no essential space import. Surely if form and length were originally retinal sensations, retinal rectangles ought not to become acute or obtuse

[1] *Cf.* E. Mach, *Beiträge zur Analyse der Empfindungen*, p. 87.

[2] *Cf.* V. Egger in *Revue philos.*, XX, p. 488.

[3] Loeb (*Pflüger's Archiv*, XL, p. 274) has proved that muscular changes of adaptation in the eye for near and far distance are what determine the form of the relief.

and lines ou,ht not to alter their relative len"ths as they do If *relief* were an optical feeling it ought not to flap to and fro with every optical condition un chan ed Here if anywhere the deniers of pace- ensations ought to be able to make their final stand [1]

full of in truction in the end Let us try it for ourselves

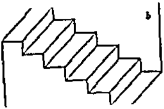
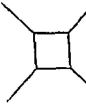


Fig 74



F G. 75

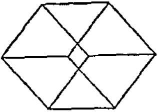


Fig. 6

In the case of the dia rams 72 73 74 75 6 the real object lines meeting or crossin, e ch ther on a plane is replaced by an *magi ed s lid t h ch e d*

a e and *why t is eas er ge eral to perceive the diagram solid than flat seems d e to pr babiliy* Those lines have countless times in our past experi ce been drawn on our ret na by solids for once that we have seen them flat on paper And hundreds of times e have looked down upon the upper surface of parall lop peds tairs and glasses for once that we have looked upwards at their bott m—hence we see the solids easiest as if from above

Habit or probability seems also to govern the illusion of the inta,lio profile and of the hollow mask. We have *never* seen a human face except in relief—

ensati ns f pace is relati t that d sensations f relief exist mpared with that f past k at h m, since ns in perceptio f th third dimensi may ha e now se t taking pla as well *against* them as *with* th m? (F and Op k p. 8 7)

t E. M h B t p 90, nd the p eceding h pt f th present w k p 503 ff

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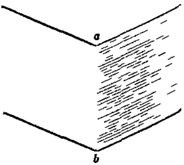


Fig 72

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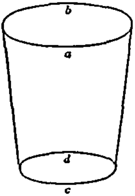


Fig 73

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[1] *Cf* E Mach *Be t ge zur Analyse der Empfi dungen* p 87

[2] *Cf* V Egger in *R v e ph l s* xx p 488

[3] Loeb (*Pfl ger's* 1 *ch v* xl p 274) has proved that muscular changes of a laptati n in the eye for ne r and far d t ce ar what d termi e the form f the relief

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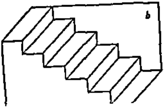
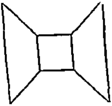


FIG 74



F G 75

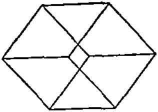


FIG 6

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s

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Th gest passag H lmh lt gum t gainst ... f p s l t t th fl t ti ns I se li f O ght t t cl d that f sensati f li f nist t ll th y must b fai t and g t h fl cn mpar d with th t f p t pe ? O ght t t b l th t th pe pti f th thi d dim ns m y h se *lk i th m* since w w se t taking pla as w ll *gai t* them as *with* th m? (P l *Op k* p 8 7)

(E M h B tc, p 90 d th p ec ding h pt f th p esent w k p 5 8ff

hence the ease with ... ice too the ... amiliar con ... viewed through Wheatstone's pseu ... ception seems wedded to certain total ways of seeing certain objects The moment the object is suggested at all it takes possession of the mind in the fulness of its stereotyped habitual form This explains the suddenness of the transformations when the perceptions change The object shoots back and forth completely from this to that familiar thing and doubtful ... terminate and composite things are excluded ... *used* to their existence

rea ... as the correct one The card flap ... is this way or that as if some inward spring sudd ly became released in our eye In these change ... s different *complements* ... plement and the image ... at the twain are one flesh as it were and cannot be di iminated in the result If the complement be as we have called it (on pp 606–07) a set of imaginary absent eye sensations they seem no whit less vividly there than the sensation which the eye now receives from without

The case of the after images distorted by projection upon an oblique plane is even more strange for the imagined perspective figure lying in the plane seems less to combine with the one a moment previo ... han to suppress it and take it ... all this is ... erior in ... new experiences prove to be almost or ... ated

The mystery is solved when we note the class to which all these experiences belong They are perceptions of definite things definitely situated in tri dimensional space The mind uniformly uses its sensations to *identify things* by ... The sensation is invariably apperceived by th ... t (p 607) of the *thing* ... traordinary mutability of its physical identit ...

... rily re ... nd ring ... From ... the appar ... of the way ... class of sensat on ... es this incessant cor ...

... r at will But this ap ... m ge l y th ... If f m this and then ... circl whose ft r mage b c m s in an us ... g p jected upon the differ nt su f ces f the room and annot then be easily made to look circular gain

rection occur What wonder then that the notion so placed should invincibly exert its habitual correcti e effect even when the object with which it combines is only an after ima e and make us perceive the latter under a chan ed but more real form? The real form is also a sensation conjured up by memory but it is one so *probable* so *hab tually* conjured up when we have just this com bination of optical experiences that it partakes of the invincible freshness of reality and seems to break throu h that law which elsewhere condemns repro- than sensations

rep oductions of real form are the aest of ...

cases lower in the scale to prove that the scale can contain no such extreme cases as the. we can definitely see why these imagination. forms of ha presence and repro There will be developed to correspond to them paths of least resistance or un their totality when any point is

curve or the distance of two lines Our mind ... facets are the att tudes of perception in which t can most easily rest These are w rn upon it by *hab tual* objects and from one of these it can pass only by tum blin o er into another

Hering has well accounted fo the sensationally vivid character of these ha b tually reproduced forms He says after remindin us that every visual sensa t n is correlated to a phys cal p ocess in the nervous apparatus

p di po tio but th *ens mble* f ff cts wr ught by timuli upon t in the course f l e h the these come thr ugh the yes or f om elsewhe e is a co-f ct r of its devel pment. To exp ess t therwise, in oluntary and oluntary experie c and ex se assist in determining the material structur f the n rv us rgan of visi and hen the w ys in which t may react o tinal image as an tw rd stimul s. That experience and exe cise hould be poss ble at all in is n is a co seq e e of

ci ty

Suppose now that in the first experien e of a complex ensati n p oduced by a partı ul etinal imag certain porti ns w e m d th pecial bj ts of ttenti n In epetiti of the sens ble experienc t will happen that notwithstanding the

1 Chapte xvIII, p 5 I ga easo why imaginati ns ght t t be as vi d as sensations. It sh uld be borne in mind that that easo does t pply to these complemental imaginings f th real shape of things actually bef re ur eyes.

identity of the outward stimulus these portions will be more easily and strongly reproduced and when this happens a hundred times the inequality with which the *various constituents of the complex sensation appeal* to consciousness grows ever greater

Now in the present state of our knowledge we cannot assert that in both the first and the last occurrence of the retinal image in question the same *pure sensation* is provoked but that the mind *interprets* it differently the last time in con equence of *experience* for the *only gi en things* we know are on the one hand the retinal image which is both times the same and on the other the mental percept which is both times different of a third thing such as a pure sensation interpolated between image and percept we know nothing We ought therefore if we wish to avoid hypotheses simply to say that the nervous apparatus reacts the last time differently from the first and gives us in consequence a different group of sensations

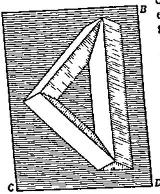
But not only by repetition of the ame retinal image but by that of similar ones will the law obtain Portions of the image common to the successive experiences will awaken as it were a stronger echo in the nervous apparatus than other portions Hence it results that *reproduction is usually elective* the more strongly reverberating parts of the picture yield stronger feelings than the rest This may result in the latter being quite overlooked and as it were eliminated from perception It may even come to pass that instead of these parts eliminated by election a feeling of entirely different elements comes to consciousness—elements not objectively contained in the stimulus A group of sensations namely for which a strong tendency to reproduction has become by frequent repetition ingrained in the nervous system will easily revive a *whole* when not its whole retinal image but only an e ential part thereof returns In this case we get some sensations to which no adequate stimulus exists in the retinal image and which owe their being solely to the reproductive power of the nervous apparatus This is *complementary* (*ergan ende*) *reprodi ction*

Thus a few points and disconnected strokes are sufficient to make us se a human face and without specially directed attention we fail to note that we see much that really is not drawn on the paper Attention will show that the outlines were deficient in spots where we thought them complete The portions of the percept supplied by complementary reproduction depend however just as much as its other portions on the reaction of the nervous apparatus upon the retinal ima e indirect thou h this reaction may in the case of the supplied portions be And so long as they are present we have a perfect right to call them sensations for they d ffer in no wi e from such sensations as correspond to an actual stimulus in the ret na Often however they are not persistent many of them may be expelled by more close ob ervation but this is not proved to be the case with all In vi ion with one eye the di tribution of parts within the third dimen ion is es entially the work of thi complementary reproduction i e of former experience When a certain (ay of l caliz ing a particular group of sensations has become with us a second nature our better knowledge our judgment our logic are of no avail Things actually d verse may give similar or almost identical retinal images e g an object extended in three dimensions and its flat per pective picture In such cases it often d pends on small accidents and especially on our will whether the one or the other group of ensati ns shall be excited We can see a relief hollow as a mould or vic t sa f r a relief illuminated from the left can look just like its mould illuminated from the right Reflecting upon this one may infer from the directi n of the hadows that one ha a relief before one and the idea of the relief will guide the nerve p oce into th right path so that the *f eling* of the rel ef is uddenly arou ed Whenever the retinal image is of such a nature that two diver e mod s of reaction on the part f the nervous apparatus are so to peak equally or nearly equally imm nent it must depend on small accidents whether the ne or the other reaction is realized

In these cases our pr ous kn wledge often has a decisive effect and helps the cor ct perc t y tory The ba e idea of the right object is tself a feeble epro- ducti n t t e develops into clear and h ely

the p o strives in am to c jure up the feeling of it w t to which no eality cor e ponds but we se t all the same

Note that no object not probable no object which we are not incessantly practised in reproduc ng can acquire this idness in imagination Objective corners are ever chan in their angles to the eyes paces their apparent size lines their distance But by no transmutation of position in pace does an objective stra ht line appear bent and only in one position out of an infinity does a broken line look straight Accordingly it is impossible by projecting the after image of a straight line upon two surfaces which make a solid angle with each other to give the line itself a sensible kink Look with it at the corner of your room the after image, which may overlap all three surfaces of the corner still continues strai ht Volkmann constructed a complicated surface of projection like that drawn in Fi 77 but he found it impossible so to th ow a straight after image upon it as to alter its visible form.



F 77

One f the situati ns in which we oftenest see things is sp ead out on the ground before us We are ncessantly drilled in makin allowance for *this* perspec to their real form in sp te of optical foreshortening

et

thing

pictu es by ma ination so as to make them more than equal to those which fall on the upper retinal surface and this habit ought to be hard to escape from e n when both halves of the object are equ distant from the eye as in a vertical l ne o paper Delbœuf has found acco dingly that if we try to bisect such a l ne we place the point of division about $\frac{1}{16}$ of its length too high

Sim la ly a square cross or a square drawn on paper should look higher than t is broad And that this is actually the case the reader may ver fy by a glance at Fig 78 For analogous reasons the upper and lower halves of the letter S or of the f gure 8 hardly seem to differ But when turned ups de down as S 8 the upper half looks much the larger

1 Hermann *H ndb d Phy l gie* III, pp 565 7

Bull t d l'A adémi b lgique d ser XIX, p

W ndt seeks t explain all these illus ns by th elati ly tr g feelin f inn rv tio needed to m th eyeballs upw rds — ca ful t dy f th muscles co cerned

identity of the outward stimulus these portions will be more easily and strongly reproduced and when this happens a hundred times the inequality with which the various constituents of the complex sensation appeal to consciousness grows ever greater

Now in the present state of our knowledge we cannot assert that in both the first and the last occurrence of the retinal ima e in question the same *pure sensation* is provoked but that the mind *interprets* it differently the last time in con equence of experience for the only *given* things we know are on the one hand the retinal image which is both times the same and on the other the mental percept which is both times different of a third thing such as a pure sensation interpolated between image and percept we know nothing We ought therefore if we wish to avoid hypotheses simply to say that *the nervous apparatus reacts the last time differently from the* first and gives us in consequence a different group of sensations

But not only by repetition of the ame retinal image but by that of similar ones will the law obtain Portions of the image common to the successive experiences will awaken as it were a stron er echo in the nervous apparatus than other portions Hence it results that *reproduction is usually elective* the more strongly reverberating parts of the picture yield stronger feelings than the rest This may result in the latter being quite overlooked and as it were eliminated from perception It may even come to pass that instead of these parts eliminated by election a feeling of entirely different elements comes to consciousness—elements not objectively contained in the stimulus A group of sensations namely for which a strong tendency to reproduction has become by frequent repetition ingrained in the nervous system will easily revive a *whole* when not its whole retinal image but only an essential part thereof returns In this case we get some sensations to which no adequate stimulus exists in the retinal image and which owe their being solely to the reproductive power of the nervous apparatus This is *complementa y (ergan ende) r productio* ı

Thus a few points and disconnected strokes are sufficient to make us see a human face and without specially directed attention we fail to note that we see much that really is not drawn on the paper Attention will show that the outlines were deficient in spots where we thought them complete The portions of the percept upplied *by complementary reproduction depend* however just as much as its other portions on the reaction of the nervous apparatus upon the retinal ima e indirect thou h this reaction may in the case of the supplied portions be And so long as they are present we have a perfect right to call them sensations for they differ in no wi e from such sensations as correspond to an actual stimulu in the retina Often however they are not persistent many of them may be expelled by more close ob *ervation* but this is not proved to be the ca e with all In vision with one eye the distribution of parts within the third dimen ion is es entially the work of this complementary reproduction i e of former experience When a certain way of localizing a particular group of sensations has become with us a second nature our better knowledge our judgment our logic are of no avail Things actually diverse may give similar or almost identical retinal images e g an object extended in three dimensions and its flat perspective picture In such cases it often d pends on small accidents and especially on our will whether the one or the other group of ensations shall be excited We can see a relief hollow as a mould or *v ce ve sa* for a relief illuminated from the left can look just like its mould illuminated from the right Reflecting upon this one may infer from the d recti n of the shadow that one has a relief before one and the idea of the rel ef will guide the nerve pro es e into the right path o that the *feel ng* of the relief is suddenly arou ed Whenever the retinal image is of such a nature that two d verse mod s of reaction on the part of the nervous apparatus are so to peak equally or nearly equally imminent it must depend on small *accidents whether the one or the other reaction is realized.*

g that they in no wise un

We t
de m n
in the
imagined sensa

These sensations so far
retinal exclusively The m
our percept on it is true
feeling of form Their function is limited to *exciting* the various
form by tracing retinal streaks and to *comparing* them and *measuring* them
off against each other by applyin different parts of the retinal surface to the
same objecti e thing Helmholtz s analys s of the facts of our *measurement of the field of view* is barrin a lapse or two masterly and seems to prove that the
mo ements of the eye ha e had some part in bringin our sense of retinal equiv
alencies about— d f different retinal forms and sizes not
forms and sizes
ments accomplis
of the retina Qu
on a central tract Fo thwith to our mind AB and *ab* are judged eq
But as H lmholtz admits the equ valence-judgment is ndependent of the way
in which we may feel the form and length of the several retinal pictures them
s

f n t

M asu e e t implies a stuff to measure Retinal sensations give the stuff object ve th gs fo m the ya d st ck mot on does the measuring operation
h f c urse be well performed only where it is possible to make the

—

feelings of movement are *pe se* As we compare the pace-value of two retinal
k I O k

l ht hich t times may b intensified till t bec mes an after imag W f ll w in l kin th di ecti f this l e, nd in d ing w shd th lin al tself and g t p lo gatı f ts le gth O pl urf ce w can carry this p ed re any sort f a raight curved ruler b t in th field f isio th is f each directi and m ment f h y nly sort f lin which t is po bl f t shd al g ts wn dir ct tinually These ar what Helmh ltz calls th ci cles f di ecti f th ıs al field— lines hi h h has studied with his usual car *Cf Physi l Optik* p 548 ff

Hering has tried to explain our exaggeration of small angles in the same way We have more to do with right angles than with any others right angles in fact,

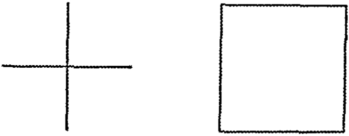


FIG 78

have an altogether unique sort of interest for the human mind Nature almost never begets them but we think space by means of them and put them every where Consequently obtuse and acute ones liable always to be the images of right ones foreshortened particularly easily revive right ones in memory It is hard to look at such figures as *a b c* in Fig 79 without seeing them in perspec tive as approximations at least to foreshortened rectangular forms [1]

At the same time the genuine sensational form of the lines before us can in all the cases of distortion by suggested perspective be felt correctly by a mind able to abstract from the notion of perspective altogether Individuals differ in this abstracting power Artistic training improves it so that after a little while er

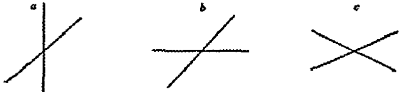


FIG 79

rors in vertical bisections in estimating height relatively to breadth etc be come impossible In other words we learn to take the optical sensation before us *pure* [2]

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look different in size because the customary correction for fo shortening bears only on the relations of the parts of pecial *things* pread out before us *Cf* Wundt *Phy I Psych* 2d ed II pp 96–98 Th Lipps *Grundtatsach n etc* p 535

[1] H ring would partly s lve in this way the mystery of F gs 60 61 and 62 N d ubt the explanation partly applies but the strange cessati n f the illusion wh n w fix the ga e fails to be accounted fo th r by

[2] Helmholtz has sought (*Phy l Opt k* p 715) t xplain th d rg nc of the app nt vertical merid ans of the two retinæ by the manner in w h ch an d nt cal line drawn n the gr und before us in the median plane will throw its mag s n the two yes re pectively The matter is too techn cal for d script on here the unl arn d read r may be referred f r it to J Le Cont s *S ght* in the Internat Scient S ie p 198 ff But fo th b n fit of th se to whom *v bum sat* I cannot help saying that it seems to me that the *xa tn* of the ela t n of the two m d ans— h ther div rg nt or n t fo th d v rg nce diff rs in indi idu als and often in one ind vidual at di ers times—preclud s its be ng due to the m re hab tual falling off of th imag of one objective line on both Le Cont e g measu es their position down to a sixth of a d g ee oth s t t nths This indicat n ganic identity in th sen sations of the two retinæ which the e peri nc of median perspective h izontals may roughly have agreed with but ha dly can hav eng nd ed Wundt pla ns the div rg nce as usual by the *Inn vat nsgefuhl* (*p cit* II p 99 ff)

For the successive application of the same thin to different pace-givin surfaces motion is indispensable and hence plays a great part in our space-education especially in that of the eye Abstractly considered the motion of the object over the sensitive surface would educate us quite as well as that of the surface over the object. But the self mobility of the organ carrying the surface *accelerates* immensely the result.

In completely educated space-perception the present sensation is usually

ited to the recall of previous space-sensations with which the present one has been associated and which may be jud ed more real than it.

Finally this reproduction may in the case of certain visual forms be as vivid or almost so as actual sensation is

The third dimens on forms an original element of all our pace-sensations In the eye it is subdivided by various discriminations The more distant subdivisions are often shut out altogether and in bein suppressed have the effect of diminishing the absolute space-value of the total field of view

Historical

Let us now close with a brief historical survey The first achievement of note in the study of space-perception was Berkeley s theory of vision This undertook to establish two points first that *d st nce* was not a visual but a tactile form of consciousness suggested by visual signs secondly that there is no one quality or dea common to the sensations of touch and s ght such that prior to experience one might possibly anticipate from the look of an object anything about its felt size hape or position or from the touch of it anything about its look.

In other words that primitively chaotic o semi-chaotic condition of our various sense spaces which we have demonstrated was established for good by Berkeley and he bequeathed to psychology the problem of describing the manner in which the deliverances are harmonized so as all to refer to one and the same extended world

His disciples in Great Britain have solved this problem after Berkeley s own fashion and to a great extent as we ha e done ourselves by the ideas of the various senses suggestin each other in consequence of Association. But e ther because they were intoxicated with the principle of association or becau e in the number of details they lo t their general bearings they have for otten as a rule to state *u der what sens ble form the prim tive spat al exper ences a e fou d* which later became associated with so many other sensible signs Heedless of the master Locke s precept that the mind can frame unto itself no one new simple idea they seem for the most part to be trying to *expla n the exten*

This shrinkage and xpansi f the bsol t space al f th t tal ptical sensati mains t my mind th most bscure part f th wh le subject. It is l ptical sensation, seeming in pecu ly t h thin t d w th locomot th suggesti ns It is easy t say that "the I tellect produces t, b t what does th t mean? Th in estigator ho ill thr w light this ne point ill pr bably clear p ther difficulties as well.

tracts by superposing them successively upon the same objective line so we also have to compare the space value of objective angles and lines by superposing them on the same retinal tract Neither procedure would be required if our eye-movements were apprehended immediately by pure muscular feeling or innervation for example as distinct lengths and directions in space To compare retinal tracts *it would then suffice simply to notice how it feels to move any image over them* And two objective lines could be compared as well by moving different retinal tracts along them as by laying them along the same It would be as easy to compare non parallel figures as it now is to judge of those which are parallel[1] Those which it took the same amount of movement to traverse would be equal in whatever direction the movement occurred

General Summary

With this we may end our long and I fear to many readers tediously minute survey The facts of vision form a jungle of intricacy and those who penetrate deeply into physiological optics will be more struck by our omissions than by our abundance of detail But for students who may have lost sight of the forest for the trees I will recapitulate briefly the points of our whole argument from the beginning and then proceed to a short historical survey which will set them in relief

All our sensations are positively and inexplicably extensive wholes

The sensations contributing to space *perception* seem exclusively to be the surface of skin the retina and the joints Muscular feelings play no appreciable part in the generation of our feelings of form direction etc

The total bigness of a cutaneous or retinal feeling soon becomes subdivided by discriminative attention

Movements assist this discrimination by reason of the peculiarly exciting quality of the sensations which stimuli moving over surfaces arouse

Subdivisions once discriminated acquire definite relations of position towards each other within the total space These relations are themselves feelings of the subdivisions that intervene When these subdivisions are *not* the seat of stimuli the relations are only reproduced in imaginary form

The various sense spaces are in the first instance incoherent with each other and primitively both they and their subdivisions are but vaguely comparable in point of bulk and form

The *education* of our space perception consists largely of two processes—reducing the various sense feelings to a common *measure* and *adding them together* into the single all including space of the real world

Both the measuring and the adding are performed by the aid of *things*

The imagined aggregate of positions occupied by all the actual or possible moving or stationary things which we know is our notion of real space—a very incomplete and vague conception in all minds

The *measuring* of our space feelings against each other mainly comes about through the successive arousal of different ones by the same *thing* by our selection of certain ones as feelings of its *real* size and shape and by the degradation of others to the status of being merely signs of these

[1] *Cf* Hering in Hermann's *Handb d r Phy* I iii, i, pp 553-54

productivity they flounder in a dismal dilemma. Mr Sully joins them there in what I must call a vague and vacillating way Mr Spencer of course is bound to pretend to [illegible] tecedents different from them selves so quality to any perception grows [illegible]

No idea of extension can arise from *simultaneous* excitation of a multitude of nerve-terminations like those of the skin or the retina, since this would imply a knowledge of their relative positions —that is a pre-existent idea of a special extension, which is absurd. No relation between *successive* states of consciousness gives in itself any idea of extension. The muscular sensations accompanying motion *are quite distinct from the notions of space and time associated with them.*

Mr Spencer none the less inveighs vociferously against the Kantian position that space is produced by the mind s own resources And yet he nowhere denies space to be a specific affection of consciousness different from time!

Such incoherency is pitiful The fact is that at bottom all these authors are really [illegible] The space they speak of is a super sensation [illegible] logical [illegible] the [illegible] clearness than anyone else He says

A man must be forsaken by all the gods to dream that the world we see outside of us filling space in its three dimensions moving down the inexorable stream of time governed at each step by Causality s in an bl l w —b t in all this only follow ing rules which w m y p escribe f t in ad an e f all experien e —t dream I sa that such w ld should tand ther o t d of us quite by ti ely real with mpl cit of urs and thereupon by ubsequent ct throu h the instrumentality f mer sensat that t should ente ur head and rec n truct a d plicate of itself a was r d Fo what po erty stricken thing is this mer ensat ! E en in th lest gans f sense t is othin mo than a local and pecific feeling us ep ble within ts kind f f w ariatio but always strictly ubjecti e and on [illegible] h b e t e n thin esemblin a perception Fo sensatio of

Onl when th l d rstandin is ar used to acti ty and brin its so e and

ha takes pla discursi ely e ecti ely b t ct by means f w ds and [illegible] but intuiti e and imm diate

Thus th U derstandin must first create the objecti wo ld never can the latter already comp et simply p omenade into ur heads thr ugh the senses and

sive quality itself account for it and evolve it by the mere association to either of feelings which originally possessed it not They first evaporate the nature of extension by making it tantamount to mere coexistence and then they explain coexistence as being the same thing as *succession* provided it be an extremely rapid or a reversible succession Space-perception thus emerges without being anywhere postulated The only things postulated are unextended feelings and time Says Thomas Brown (lecture XXIII) I am inclined to reverse exactly the process commonly supposed and instead of deriving the measure of time from extension to derive the knowledge and original measure of extension from time Brown and both the Mills think that retinal sensations colors in their primitive condition are felt with no extension and that the latter merely becomes inseparably associated with them John Mill says Whatever may be the retinal impression conveyed by a line which bounds two colors I see no ground for thinking that by the eye alone we could acquire the conception of what we now mean when we say that one of the colors is outside [beside] the other [1]

Whence does the extension come which gets so inseparably associated with these non extended colored sensations? From the sweep and movements of the eye—from muscular feelings But as Prof Bain says if movement feelings give us any property of things it would seem to be not space but time [2] And John Mill says that the idea of space is at bottom one of time [3] Space then is not to be found in any elementary sensation but in Bain s words as a quality it has no other origin and no other meaning than the *association* of these different [non spatial] motor and sensitive effects [4]

This phrase is mystical sounding enough to one who understands association as *producing* nothing but only as knitting together things already produced in separate ways The truth is that the English Associationist school in trying to show how much their principle can accomplish have altogether overshot the mark and espoused a kind of theory in respect to space perception which the general tenor of their philosophy should lead them to abhor Really there are but three possible kinds of theory concerning space Either (1) there is no spatial *quality* of sensation at all and space is a mere symbol of succession or (2) there is an *extensive quality given* immediately in certain particular sensations or finally (3) there is a *quality produced* out of the inward resources of the mind to envelop sensations which as given originally are not spatial but which on being cast into the spatial form become united and orderly This last is the Kantian view Stumpf admirably designates it as the psychic stimulus theory the crude sensations being considered as goads to the mind to put forth its slumbering power

Brown the Mills and Bain amid these possibilities seem to have gone astray like lost sheep With the mental chemistry of which the Mills speak—precisely the same thing as the psychical synthesis of Wundt which as we shall soon see is a principle expressly intended to do what Association can never perform—they hold the third view but again in other places imply the first And between the impossibility of getting from mere association anything not contained in the sensations associated and the dislike to allow spontaneous mental

[1] *Exam nat n of H milton* 3d ed p 283 [2] *The S n es nd the Int llect* 3d ed p 183
[3] *Loc cit* 3d ed., p 283 [4] *Loc cit* p 372

There is not one moment of passive inextensive sensation succeeded by another of active extensive perception but the form I see is as immediately felt as the color which fills it out That the higher parts of the mind come in who can deny? They add and subtract they compare and measure they reproduce and e sations with intellectual relations but

the world is made

The essence of the Kantian contention is that there are not *spaces* but *Space* —o e nfinite continuous *Un t*—and that our knowled e of *this* cannot be a piecemeal *sensational* affair produced by summation and abstraction To which the obvious reply is that if any known thin bears on its front the *appearance* of piecemeal construction and abstraction it is this very notion of the infinite unitary pace of the world It is a *notion* if ever there was one and no intui tion Most of us apprehend it in the barest symbolic abridgment and if per chance we e er do try to make it more adequate we just add one image of sen s ble extens on to another until we are tired Most of us are obliged to turn round and drop the thought of the pace in front of us when we think of that behind And the pace represented as near to us seems more minutely subdivisible than that we think of as lying far away

The other prominent German writers on space are also psychical stimulists Herbart whose influence has been widest says the resting eye sees no space and ascribes visual extension to the influence of movements combining with the non spatial retinal feel ngs so as to form gradated series of the latter A gi en sensation of such a series reproduces the idea of its associates in regular order and its idea is sim larly reproduced by any one of them with the order e e sed Out of the fusion of these two contrasted reproductions comes the form of space —Hea en knows how

The obvious object on is that mere serial order is a *genus* and space-order a very peculiar pecies of that *genus* and that if the terms of revers ble series be came by that fact coexistent terms in pace the musical scale the de rees of warmth and cold and all other ideally graded series ought to appear to us in the shape of *exte ded corpo eal* aggregates —which they notoriously do not though we may of course *symbol e* their order by a patial scheme W Volkmann von V lkmar the Herbartian takes the bull here by the horns and says the mus cal scale s patially e tended though he admits that its pace does not belong to the real world I am unacquainted with any other Herbartian so bold

To Lotze we owe the much *used term local sign* He insisted that pace c ld not emi rate directly into the mind from without but must be *recon tructed* by the soul and he seemed to think that the fi st reconstructions of it by the soul must be super sensational But why sensations themselves m ght not be the soul s *orig al* spatial reconstructive acts Lotze fails to explain

tains lly

organic apertures For the senses yield us nothing further than the raw material which must be first elaborated into the objective conception of an orderly physical world system by means of the aforesaid simple forms of Space Time and Causality

Let me show the great chasm between sensation and perception by showing how raw the material is out of which the fair structure is upreared Only two senses serve objective perception touch and sight They alone furnish the data on the basis whereof the Understanding by the process indicated erects the objective world

These data in themselves are still no perception that is the Understanding's work If I press with my hand against the table the sensation I receive has no analogy with the idea of the firm cohesion of the parts of this mass *only when my Understanding* passes from the sensation to its cause does it create for itself a body with the properties of solidity impenetrability and hardness When in the dark I lay my hand on a surface or grasp a ball of three inches diameter in either case the same parts of the hand receive the impression but out of the different contraction of the hand in the two cases my Understanding constructs the form of the body whose contact caused the feeling and confirms its construction by leading me to move my hand over the body If one born blind handles a cubical body the sensations of his hand are quite uniform on all sides and in all directions —only the corners press upon a smaller part of his skin In these sensations as such there is nothing whatever analogous to a cube But from the felt resistance his Understanding infers immediately and intuitively a cause thereof which now presents itself as a solid body and from the movements of exploration which the arms made whilst the feelings of the hands remained constant he constructs in the space known to him *a priori* the body's cubical shape Did he not bring with him ready made the idea of a cause and of a space with the laws thereof there never could arise out of those successive *feelings in his hand the image of a cube If we let a string run through our closed* hand we immediately construct as the cause of the friction and its duration in such an attitude of the hand a long cylindrical body moving uniformly in one direction But never out of the pure sensation in the hand could the idea of movement that is of change of position in space by means of time arise such a content can never lie in sensation nor come out of it

Our Intellect antecedently to all experience must bear in itself the intuitions of Space and Time and therewithal of the possibility of motion and no less the idea of Causality to pass from the empirically given feeling to its cause and to construct the latter as a [illegible] moving body of the designated shape For how great is the abyss between the mere sensation in the hand and the ideas of causality materiality and movement through Space *occurring in Time! The feeling in the hand* even with different contacts and positions is something far too uniform and poor in content for it to be possible to construct out of *it* the idea of Space with its three dimensions of the action of bodies on each other with the properties of extension impenetrability cohesion shape hardness softness rest and motion—in short the foundations of the objective world This is only possible through Space Time and Causality being preformed in the Intellect itself [illegible] from whence it again follows that the perception of the external world is essentially an intellectual process a work of the Understanding *to which sensation furnishes merely the occasion* and the data to be interpreted in each particular case

I call this view mythological because I am conscious of no such Kantian machine shop in my mind and feel no call to disparage the powers of poor sensation in this merciless way I have no introspective experience of mentally producing or creating space My space intuitions occur not in two times but in one

[1] [illegible] pp. 5[illegible]-57

sensorial quality; our own account equally disclaimed ability to analyze it, but said its antecedents were cerebral not psychical—in other words, that it was a *first* psychical thing. This is merely a question of probable fact, which the reader may decide.

And now what shall be said of Helmholtz? Can I find fault with a book which on the whole I imagine to be one of the four or five greatest monuments of human genius in the scientific line? If truth impels I must fain try, and take the risks. It seems to me that Helmholtz's genius moves most securely when it keeps close to particular facts. At any rate it shows least strong in purely speculative passages, which in the *Optics*, in spite of many beauties, seem to me fundamentally vacillating and obscure. The empiristic view which Helmholtz defends is that the ... we perceive are in every case products of a process of unc... d...ction or analogy — ... But the latter sensation ...

But how, it may be asked, can association produce ... things associated? How can we by induction or analogy infer what we do not already ... know? Can suggestions of experience reproduce elements which no particular experience originally contained? This is the point by which Helmholtz's empiristic theory as a *theory* must be judged. No theory is worth ... the name which leaves such a point obscure.

Well, Helmholtz does so leave it. At one time he seems to fall back on inscrutable powers of the soul and to range himself with the psychical stimulists ... made the essential step in the matter in distin... ...

... directly with certain neural events, he says it is better to assume only such simple psychic activities as we *know* to exist, and gives the association of ideas as an instance of what he means. Later, he reinforces this remark by confessing that he does not see how any neural process *can* give rise without antecedent experience to a ready made (*fertige*) perception of space. And finally, in a ... momentous sentence he speaks of sensations of *touch* as if they might be the original material of our space-percepts—which thus from the optical point of view may be assumed as given.

Of course the eye-man has a right to fall back on the skin-man for help at a pinch. But does not this mean that he is a mere eye-man and not a complete psychologist? In other words, Helmholtz's *Optics* and the empiristic theory therein professed must not be understood as attempts at answering the general ...

p. ... pp. 443 ... p. 4 ... p. 44 ... pp. 442 ... ... Cf. also P...r Scientific Lectur... pp. 3... 303.
p. 5 ... see also pp. 4...5, 44 ... p. 7 ... p. 8 ... Bottom of p. ...

Wundt has all his life devoted himself to the elaboration of a space theory of which the neatest and most final expression is to be found in h r II, pp 457–60) He says

r aat no
sm ensive form but that everywhere
in pace heterogeneous feelings combine If we simply suppose that luminous sensations *per se* feel extensive our supposition is shattered by that influence of movement in vision which is so clearly to be traced in many normal *errors in the measurement of the field of view If we assume on the other hand* that the movements and their feelings are alone possessed of the extensive quality we make an unjustified hypothesis for the phenomena compel o accord an influence to movement but ev is indif ferent for h h rigor ously to ex o com *binations* of ement

Thus Wundt dividing theories into nativistic and genetic calls his own a genetic theory To distinguish it from other theories of the same class he names it a theory of complex local signs

It supposes tw

nts In its psychological nature t ive synthesis it consists in the fusion of both groups of sensations into a product whose elementary components are no *longer separable* from each other in idea In melting wholly away into the product which they create they become consciously undistinguishable and the mind apprehends only their re sultant the intuition of space Thus there obtains a certain analogy between this psychic synthesis and that chemical synthesis which out of simple bodies generates *a compound that appears to our immediate perception as a homogeneous* whole with new properties

Now let no modest reader think that if this sounds obscure to him it is be*cause he does not know the full context and that if a wise professor* like Wundt can talk so fluently and plausibly about combin d psychic synthe sis it must surely be

aru unintelligibility Wundt s
est thing in the world It starts by an untrue assumption and then corrects it by an unmeaning phrase Retinal sensations *are* patial and were they not *no amount of synthesis with equally* spaceless motor sen sations could intelligibly make them so Wundt s theory is in short but an avowal of impotence and an appeal to the inscrut It confesses that we cannot

sen
ate as Wundt
m rges m
the way
n which consci usness is endowed.

definite direction the impossibility of perceiving it without perceiving its direc-

... the conditions of the latter are demanded of the former state of mind, and all sorts of mythological processes are brought in to help. As well might one say that because the world consists of all its parts, therefore we can only apprehend it at all by having unconsciously summed these up in our head. It is the old idea of our actual knowledge being drawn out from a pre-existent potentiality, an idea which, whatever worth it may metaphysically possess, does no good in psychology.

My own sensationalistic account has derived most aid and comfort from the writings of Hering, A. W. Volkmann, Stumpf, Le Conte, and Schön. All these authors allow ample scope to that Experience which Berkeley's genius saw to be a present factor in all our visual acts. But they give Experience some grist to grind, which the *soi-disant* "empiristic" school forgets to do. Stumpf seems to me the most philosophical and profound of all these writers; and I owe him much. I should doubtless have owed almost as much to Mr. James Ward, had his article on Psychology in *The Encyclopædia Britannica* appeared before my own thoughts were written down. The literature of the question is in all languages very voluminous. I content myself with referring to the bibliography in Helmholtz's and Aubert's works on Physiological Optics for the visual part of the subject, and with naming in a note the ablest works in the English tongue which have treated of the subject in a *general* way.*

... audacious assumption that there ... distances (*Mind*, III, p.) ... experience ... reference to real space, stands in contradiction with the very idea of localization, which means the reference to a determinate point of space (*Physiol. Psych.*, 1st ed., p. 480).

* G. Berkeley: *Essay towards a New Theory of Vision*. — S. Bailey: A Review of Berkeley's *Theory of Vision* (1842). — J. S. Mill: Review of Bailey, in his *Dissertations and Discussions*, vol. II. — Jas. Ferrier: Review of Bailey, in *Philosophical Remains*, vol. II. — A. Bain: *The Senses and the Intellect*, Intellect, chap. I. — H. Spencer: *Principles of Psychology*, pt. VI, chaps. XIV–XVI. — J. S. Mill: *Examination of Hamilton*, chap. XIII (the best statement of the so-called English empiricist position). — T. K. Abbott: *Sight and Touch*, 1864 (the first English book to go at all minutely into facts. Mr. Abbott maintains retinal sensations to be originally of space in three dimensions). — A. C. Fraser: Review of Abbott, in *North British Review*. See another review in *Macmillan's Magazine*, 1865. — J. Sully: *Outlines of Psychology*, chap. VI. — J. Ward: *Encyclop. Brit.*, 9th ed., article Psychology, pp. 53–55. — J. E. Walter: *The Perception of Space and Matter* (1879). — I may also refer to the discussion between Prof. G. Croom Robertson, Mr. J. Ward, and the present writer in *Mind*, vol. XIII.

question of *how* space-consciousness enters the mind They simply deny that it enters with the first optical sensations [1] Our own account has affirmed stoutly that it enters *then* but no more than Helmholtz have we pretended to show *why* Who calls a thing a first sensation admits he has no theory of its production Helmholtz though all the while without an articulate theory makes the world think he has one He beautifully traces the immense part which reproductive processes play in our vision of space and never—except in that one pitiful little sentence about touch—does he tell us just what it is they reproduce He *limits himself to denying that they reproduce originals of a visual sort* And so difficult is the subject and so magically do catch words work on the popular scientist ear that most likely had he written physiological instead of nativistic and spiritualistic instead of empiristic (which synonyms Hering suggests) numbers of his present empirical evolutionary followers would fail to find in his teaching anything worthy of praise But since he wrote otherwise they hurrah for him as a sort of second Locke dealing another death blow at the old bugaboo of innate ideas His nativistic adversary Hering they probably imagine—*Heaven save the mark!—to be a scholastic in modern disguise*

After Wundt and Helmholtz the most important anti sensationalist space-philosopher in Germany is Professor Lipps whose deduction of space from an order of non spatial differences continuous yet separate is a wonderful piece of subtlety and logic And yet he has to confess that continuous differences form in the first instance only a logical series which *need* not appear spatial and that wherever it does so appear this must be accounted a fact due merely to the nature of the soul [2]

Lipps and almost all the anti sensationalist theorists except Helmholtz seem guilty of that confusion which Mr Shadworth Hodgson has done so much to *clear away viz the confounding of the analysis of an idea with the means of* its production Lipps for example finds that every space we think of can be broken up into positions and concludes that in some undefined way the several positions must have pre existed in thought before the aggregate space could have appeared to perception Similarly Mr Spencer defining extension as an aggregate of relations of coexistent position says every cognition of magnitude is a cognition of relations of position [3] and no idea of extension can arise from the simultaneous excitation of many nerves unless there is a knowledge of their relative positions Just so Prof Bain insists that the very *meaning* of space is scope for movement and that therefore distance and magnitude *can* be no original attributes of the eye s sensibility Similarly because movement is *analyzable into positions occupied at successive moments by the mover* philosophers (e g Schopenhauer as quoted above) have repeatedly denied the possibility of *its* being an immediate sensation We have however seen that it is the most immediate of all our space sensations *Because it can only occur in a*

[1] In fact to bor w a mile from P f G L Mulle (*Th d nal A fm k mk t* p 8) the vari us senses b ar in the H lmholt ian ph lo phy f perc pti n th sam r l t on to the *bject pe ev d by the r means that a t oop of j lly drink s bear t the l nd lord s bill* when no ne ha any m ney but each hopes that one of the rest ill p y

[2] *Grundtatsach n d s S l l b ns* (1883) pp 480 59 -92 *Psy holog k Stud n* (1885) p 14 [3] *P ychology* 11 p 174 *Ib d* p 168

[3] *The S nses and the Int ll ct* 3rd d pp 366–75

definite direction the impossibility of perceiving it without perceiving its direction has been decreed—a decree which the simplest experiment overthrows. It is a case of what I have called the 'psychologist's fallacy': mere acquaintance with space is treated as tantamount to every sort of knowledge about it, the conditions of the latter are demanded of the former state of mind, and all sorts of mythological processes are brought in to help. As well might one say that because the world consists of all its parts, therefore we can only apprehend it at all by having unconsciously summed these up in our head. It is the old idea of our actual knowledge being drawn out from a pre-existent potentiality, an idea which, whatever worth it may metaphysically possess, does no good in psychology.

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C. Hall and Donaldson in *Mind*, x, p. 559.
... take Mr. Sully: "The *fallacious* assumption that there ...

[1] Berkeley: *Theory of Vision* (1709). J. S. Mill: Review of Bailey, in his *Dissertations and Discussions*, vol. II. Jas. Ferrier: Review of Bailey, in *Philosophical Remains*, vol. II. A. Bain: *The Senses and the Intellect*, Intellect, chap. I. H. Spencer: *Principles of Psychology*, pt. VI, chaps. XIV-XVI. J. S. Mill: *Examination of Hamilton*, chap. XIII (the best statement of the so-called English empiricist position). T. K. Abbott: *Sight and Touch* (1864) (the first English book to go at all minutely into *facts*. Mr. Abbott maintains retinal sensations to be originally of space in three dimensions). A. C. Fraser: Review of Abbott, in *North British Review*, Aug. 1864; also another review in *Macmillan's Magazine*, Aug. 1866. J. Sully: *Outlines of Psychology*, chap. VI. J. Ward: *Encyclop. Britannica*, 9th ed., article Psychology, pp. 53-55. J. E. Walter: *The Perception of Space and Matter* (1879).—I may also refer to the discussion between Prof. G. Croom Robertson, Mr. J. Ward, and the present writer in *Mind*, vol. XIII.

Chapter XXI

THE PERCEPTION OF REALITY

Belief

Everyone knows the difference between imagining a thing and believing in its existence between *supposing a proposition and acquiescing in its truth* In the case of acquiescence or belief the object is not only apprehended by the mind but is held to have reality Belief is thus the mental state or function of cognizing reality As used in the following pages Belief will mean every degree of assurance including the highest possible certainty and conviction

There are as we know *two ways of studying every psychic state First* the way of analysis What does it consist in? What is its inner nature? Of what sort of mind stuff is it composed? Second the way of history What are its conditions of production and its connection with other facts?

Into the first way we cannot go very far *In its inner nature belief or the sense of reality is a sort of feeling more allied to the emotions than to anything else* Mr Bagehot distinctly calls it the emotion of conviction I just now spoke of it as acquiescence It resembles more than anything what in the psychology of volition we know as consent Consent is recognized by all to be a manifestation of our active nature It would naturally be described by such terms as willingness or the turning of our disposition What characterizes both consent and belief is the cessation of theoretic agitation through the advent of an idea which is inwardly stable and fills the mind solidly to the exclusion of contradictory ideas When this is the case motor effects are apt to follow Hence the states of consent and belief characterized by repose on the purely intellectual side are both intimately connected with subsequent practical activity This inward stability of the mind s content is as characteristic of disbelief as of belief But we shall presently see that we never disbelieve anything except for the reason that we believe something else which contradicts the first thing Disbelief is thus an incidental complication to belief and need not be considered by itself

The true opposites of belief psychologically considered *are doubt and inquiry not disbelief* In both these states the content of our mind is in unrest and the emotion engendered thereby is like the emotion of belief itself perfectly distinct but perfectly indescribable in words Both sorts of emotion may be pathologically exalted One of the charms of drunkenness unquestionably lies in the deepening of the sense of reality and truth which is gained therein In whatever light things may then appear to us they seem more utterly what they

Compare this psychological fact with the corresponding logical truth that all negation is only covert assertion of something else than the thing denied. (See Bradley s *Principles of Logic* bk. I chap 3)

are more utterly utter' than when we are sober This goes to a fully unutterable extreme in the nitrous oxide intoxication in which a man s very soul will sweat with con iction and he be all the while unable to tell what he is convinced of at all The pathological state opposed to this olidity and deepening has been called the questionin mania (*Grubelsucht* by the Germans) It is sometimes foun n m ow mal or chronic and consists in the inability and explained ay u — chair a chair? How is it that men are only *of the size they are* — — big as houses? etc. etc There is it is true another pathological state which is as far removed from doubt as from belief and which some may prefer to consider the proper contrary of the latter state of mind I refer to the feeling that everythin is hollow unreal dead I shall speak of this state again upon a later pa e The point I wish to notice here is simply that belief and disbelief are but two aspects of one psychic state

John M ll reviewing various op nions about belief comes to the conclusion that no account of it can be given

> What [he says] is th differen e *to ur minds* betw en thinking of a reality and rep esenting to urself an imaginary p cture? I o fess I can no escape f om the opini that the distinction s ultimate and primo dial. There is o m e difficulty in h lding t t be than in h ldin th diffe ence betw en a ensation and an idea t be prim dial It eems alm st anoth r aspe t of the sam difference. I can t help thinking th ef r that the is in the remembrance of a eal fa t, as distinguished from that of a th ught an element which does not c n t in a dif enc betwe th m r deas which are p esent to the mind in the two cases. Th lement h w oever we defin t, onstitutes beli f and the difference betw en M m ry and Imaginatio F m what er di ecti we pproach, this dif ence seems to l se ou path When w arri e at t we seem to ha e eached as t were, th tral point of ur intellectual natu p e ppo ed and built upon in every ttempt we make t explain the more reco dit phenomena of our mental bein

See h ry rema kable littl w k, *Th t sthetic Rev lution and the Gust f Phi o-* 1

pr bable that th man wh has th k y is hand? Is the man careful so t f perso ? Will h k be hanging peg? Am I thinkin rightly? P rhaps the d 't loc th d pot' — m oo would be lifted t go down I hould be conscious t atem t th t I was losing my chance b I should be unabl t stir until ll these hs rdities were entertained and disposed f I th m st cri cal m ment *of my lif* wh I ught t ha e been so eng ssed as lear m for ond ry th ght I ha e bee ppressed b th inability t be per And m th m dinary circumstances t is ll th sam Let m instance th ther morning when I w t t walk. Th day was biting cold, b t I was unabl t proceed ex ept b y ks. Once I g t arrested, my feet in muddy pool On foot was lifted to g kno ing that t as not good t be standing in w ter b t there I was fast th cause f d t uon being th discussi g th myself the reasons wh I sh uld t tand in that pool. (T S Clous Clinical Le tur Mental Dis ases [883] p. 43 See also Berger in *Archiv f P chiatrie* 2, p 7)

Note to Jame Mill Analysis I, pp. 4 2– 3.

If the words of Mill be taken to apply to the mere subjective analysis of belief—to the question What does it feel like when we have it?—they must be held on the whole to be correct Belief, the sense of reality feels like itself—that is about as much as we can say

Prof Brentano in an admirable chapter of his *Psychologie* expresses this by saying that conception and belief (which he names *judgment*) are two different fundamental psychic phenomena What I myself have called (p 178) the object of thought may be comparatively simple like Ha! what a pain or It thunders or it may be complex like Columbus discovered America in 1492 or There exists an all wise Creator of the world In either case however the mere thought of the object may exist as something quite distinct from the belief in its reality The belief as Brentano says presupposes the mere thought

> Every object comes into consciousness in a twofold way as simply thought of [*vorgestellt*] and as admitted [*anerkannt*] or denied The relation is analogous to that which is assumed by most philosophers (by Kant no less than by Aristotle) to obtain between mere thought and desire Nothing is ever desired without being thought of but the desiring is nevertheless a second quite new and peculiar form of relation to the object a second quite new way of receiving it into consciousness No more is anything judged [i e believed or disbelieved] which is not thought of too But we must insist that so soon as the object of a thought becomes the object of an *assenting or rejecting* judgment our consciousness steps into an entirely new relation towards it It is then twice present in consciousness as thought of and as held for real or denied just as when desire awakens for it it is both thought and simultaneously desired (p 266)

The commonplace doctrine of judgment is that it consists in the combination of ideas by a copula into a proposition which may be of various sorts as affirmative negative hypothetical etc But who does not see that in a disbelieved or doubted or interrogative or conditional proposition the ideas are combined in the same identical way in which they are in a proposition which is solidly believed? *The way in which the ideas are combined is a part of the inner constitution of the thought s object or content* That object is sometimes an articulated whole with relations between its parts amongst which relations that of predicate to subject may be one But when we have got our object with its inner constitution thus defined in a proposition then the question comes up regarding the object as a whole Is it a real object? is this proposition a true proposition or not? And in the answer *Yes* to *this* question lies that new psychic act which Brentano calls judgment but which I prefer to call belief

In every proposition *then so far as it is believed questioned or disbelieved* four elements are to be distinguished the subject the predicate and their relation (of whatever sort it be)—these form the *object* of belief—and finally the psychic attitude in which our mind stands towards the proposition taken as a whole—and this is the belief itself

Admitting then that this attitude is a state of consciousness *sui generis* about which nothing more can be said in the way of internal analysis let us proceed to the second way of studying the subject of belief *Under what cir*

[1] For an excellent account of the history of opinion on this subject see A Marty in *Vierteljahrsch f wiss Phil* viii 161 ff (1884)

cumstances do we think things real? We shall soon see how much matter this gives us to discuss.

The Various Orders of Reality

Suppose a new-born mind entirely blank and waiting for experience to begin Suppose that it begins in the form of a visual impression (whether faint or vivid is immaterial) of a lighted candle against a dark background and nothing else so that whilst this im
to the mind in question Supp
the candle is only imaginary and that no original
psychologists outside Will this hallucinatory candle be believed in will it have a real existence for the mind?

What possible sense (*for that mind*) would a suspicion have that the candle was not real? What would doubt or disbelief of it imply? When *we* the onlooking psychologists say the candle *is* unreal we mean something quite definite viz., that there is a world known to *us* which *is* real and to which we perceive that the candle does not belong it belongs exclusively to that individual mind has no st t s anywhere else etc. It exists to be sure in a fashion for it forms the content of that mind s hallucination but the hallucination itself though unquestionably it is a sort of existing fact has no knowledge of *other* facts and since those *other* facts are the realities *par excellence* for us and the only things we believe in the candle is simply outside of our reality and belief al to ther

B th h pothesis however the *m nd which sees the candle* can spin no such

tion is absorbed by

quality of this candle no other possible place or possible object in the place no alternati e in short, suggests itself as even conceivable so how can the mind help believin the candle real The supposition that *it* might possibly not do so is under the supposed conditions unintelligible.

This is what Spinoza lon ago announced

> Let us concei a boy [he said] imagining t himself a horse and takin note of nothing else As this imagination in l es th existence of the horse, *and the boy has no p ptio wh ch an uls it xistence* he will necessarily co template the horse as p esent will he be ab e to doubt of ts existence however little certain of i he ma be I deny that a man in so far as he imagines [e cipit] affirms nothing. For t t im gine a winged h rse but t affirm that th horse [that h rse, nam l] has ings F f th mind had n thing befo e t but the winged h rse it w uld con template the sam as p esent would ha cause to doubt of ts existen nor an power f dissenting from ts existenc unless the imaginati n of th winged horse wer j ined to an dea which contradi ted [to t] its existence. (*Ethics* II p 49 Sch lium)

W saw near th end f Chapter XIX that candle-imag takin exclusi possessio f the mind in this w y would probably equir th sensational vividness. B t this ph siological acciden is logicall immat rial t th argument in the t xt which ught to pply w ll the dimmest sort f mental ima as t the brightest sensation.

The sense that anything we think of is unreal can only come then when that thing is contradicted by some other thing of which we think *Any object which remains uncontradicted is* ipso facto *believed and posited as absolute reality*

Now how comes it that one thing thought of can be contradicted by another? It cannot unless it begins the quarrel by saying something inadmissible about that other Take the *mind with the candle or the boy with the horse If either of* them say That candle or that horse even when I don t see it exists in *the outer world* he pushes into the outer world an object which may be incompatible with everything which he otherwise knows of that world If so he must take his choice of which to hold by the present perceptions or the other knowledge of the world If he holds to the other knowledge the present perceptions are contradicted *so far as their relation to that world goes* Candle and hor e whatever they may be are not existents in outward space They are existents of course they are mental objects mental objects have existence as mental objects But they are situated in their own spaces the space in which they severally appear and neither of those spaces is the space in which the realities called the outer world exist

Take again the horse with wings If I merely dream of a horse with wings my horse interferes with nothing else and has not to be contradicted That horse its wings and its place are all equally real That horse exists no otherwise than as winged and is moreover really there for that place exists no otherwise than as the place of that horse and claims as yet no connection with the other places of the world But if with this horse I make an inroad into the *world otherwise known* and say for example That is my old mare Maggie having grown a pair of wings where she stands in her stall the whole case is altered for now the horse and place are identified with a horse and place otherwise known and *what* is known of the latter objects is incompatible with what is perceived with the former Maggie in her stall with wings! Never! The wings are unreal then visionary I have dreamed a lie about Maggie in her stall

The reader will recognize in these two cases the two sorts of judgment called in the logic books existential and attributive respectively The candle exists as an outer reality is an existential My Maggie has got a pair of wings is an attributive proposition [1] and it follows from what was first said that *all propositions whether attributive or existential are believed through the very fact of being conceived unless they clash with other propositions believed at the same time by affirming that their terms are the same with the terms of these other propositions* A dream candle has existence true enough but not the same

[1] In both existential and attributive judgm nts a ynthes is repr sented The yll bl x in the v ord Existence *da* in the v d *D* *n* e press it The candle xists Is qu val nt to The candl *t th e* And the v r th m an l pac p c l t l to tl reals The proposition amounts to say ng The andl s in th am p e w th th r e *l* It affirms of th candl a very c ncr te pr di ate—nam ly this rel t n to th part cula concrete th ngs *Tl* al xisten as v hall l t r se l tself nt th peculia relation to *u* *h s* Exist nc i thu no ul t nt v qu l ty wh n w p l t t f object it s a r lati n ultim t ly term n t ng in u selv s and at the m m nt h t terminates *b com ng a p ct al* el tion But of th m n n I only w sh n w to indi cate the superf cial nature of th dist n tion betw en the existential and th attribut ve propo it on

e (existence for itself nam
(
l

now think of i
choose which
dictory ways at once *The whole distinction of real a u*
chology of belief disbelief and doubt is thus grounded on two mental facts—
first that we are liable to think diffe ently of the same and second that when
we have done so we can choose which way of thinking to adhere to and which
to d sregard

The subjects adhered to become real subjects the attributes adhered to real attributes the existence adhered to real existence whilst the subjects disregarded become imaginary subjects the attributes disregarded erroneous attributes and the existence disregarded an existence in no man s land in the limbo where footless fancies dwell The real things are in M Taine s terminology the *reducti es* of the things jud ed unreal

The Many Worlds

Hab tually and practically we do not *count* these disregarded things as existents at all For them *l œ ictis* is the law in the popular philosophy they are not even treated as appearances they are treated as if they were mere waste equ alent to nothing at all To the genuinely philosophic m nd ho vever they st ll ha th igh not the same existence as the real things *As* objects of fanc defeas are in is thus

Two sub-uni erses at least connected by relations which philosophy tries to ascertain Really there are more than two sub universes of wh ch we take account some of us of this one and others of that For there are various cate- o es both of illus on and of real ty and alongside of the world of absolute error (i e err r confined to s ngle ndividuals) but still within the world of absolute eal ty (e re lity believed by the complete philosopher) there is the world of c llective e ror there are the worlds of abstract reality of relative or practical re l ty of ideal relat ons and there is the supernatural world The popular mind co e c of all these sub-wo lds more or less d sconnectedly and when deal

)
seeks to determine the relation of each sub wo ld to the others in the total world wh ch is

The most important sub universes commonly discriminated from each other and recogn zed by most of us as existing each vith its own special and separate style f e istence are the following

1 The world of sense or of phys cal things as we instinctively apprehend

them with such qualities as heat color and sound and such forces as life chemical affinity gravity electricity all existing as such within or on the surface of the things

2 The world of science or of physical things as the learned conceive them with secondary qualities and forces (in the popular sense) excluded and nothing real but solids and fluids and their laws (i e customs) of motion[1]

3 The world of ideal relations or abstract truths believed or believable by all and expressed in logical mathematical metaphysical ethical or æsthetic propositions

4 The world of idols of the tribe illusions or prejudices common to the race All educated people recognize these as forming one sub universe The motion of the sky round the earth for example belongs to this world That motion is not a recognized item of any of the other worlds but as an idol of the tribe it really exists For certain philosophers matter exists only as an idol of the tribe For science the secondary qualities of matter are but idols of the tribe

5 The various supernatural worlds the Christian heaven and hell the world of the Hindoo mythology the world of Swedenborg s *visa et audita* etc Each of these is a consistent system with definite relations among its own parts Neptune s trident e g has no status of reality whatever in the Christian heaven but *within the classic Olympus certain definite things are true of it* whether one believe in the reality of the classic mythology as a whole or not The various worlds of deliberate fable may be ranked with these worlds of faith—the world of the *Iliad* that of *King Lear* of the *Pickwick Papers* etc[2]

6 The various worlds of *individual opinion* as numerous as men are

7 The worlds of sheer madness and vagary also indefinitely numerous

Every object we think of gets at last referred to one world or another of this or of some similar list It settles into our belief as a common sense object a scientific object an abstract object a mythological object an object of some one s mistaken conception or a madman s object and it reaches this state sometimes immediately but often only after being hustled and bandied about amongst other objects until it finds some which will tolerate its presence *and stand in relations to it* which nothing contradicts The molecules and ether waves of the scientific world for example simply kick the object s warmth and color out they refuse to have any relations with them But the world of idols of the tribe stands ready to take them in *Just so the world of classic* myth takes up the winged horse the world of individual hallucination the vision of the candle the world of abstract truth the proposition that justice is

[1] I define the scientific universe here in the radical m chan al way P act cally it is oft ner th ught of in a m ng el way and sembl s n more points the popula physical world

[2] It thus me ab ut that w can say su h things a that I anh I I n t lly m ry Rebecca as Thackeray *fal ly m k s him do Th I I anh e o ld u th* ne which S tt wrote do vn f r u *I th t a ld* I anh d e t m rs R bec Th bj t w th n th t world are knit tog ther by p f ctly d fn te l ti ns h h can b affi med *I nl d* Whilst ab orbed in th n v l e turn u b k n all th w ll and f th tim the Ivanhoe world r main ou absolut l ty Wh n w w k f m th pell h w v find a still mo e real w ld vh h d I h nd ll th r n ect l w th h m to the ficti e status and rele tes th m t one f th ub n g ped und r No 5

kingly though no actual king be just. The various worlds themselves however appear (as aforesaid) to most men s minds in no very definitely conceived relation to each other and our attention when it turns to one is apt to drop the others for the time being out of its account Propositions concerning the different worlds are made from different points of view and in this more or less cha otic state the consciousness of most thinkers remains to the end Each world *whilst it is attended to* is real after its own fashion only the reality lapses with the attention

The World of Practical Realities

Each thinker however has dominant habits of attention and these *practically elect from among the various worlds some one to be for him the world of ultimate realities* From this world s objects he does not appeal Whatever positively contradicts them must get into another world or die. The horse e.g may have wings to its heart s content so long as it does not pretend to be the real world s horse—*that* horse is absolutely wingless. For most men as we shall immediately see the things of sense hold this prerogative position and are the absolutely real world s nucleus Other things to be sure may be real for this man or for that—things of science abstract moral relations things of the Christian th 1 m what not But even for the pecial man, these things are u ally rea
taken less
in them is — —

In all this the everlasting partiality of our nature shows itself our inveterate propensity to choice For in the strict and ultimate sense of the word existence everything which can be tho ght of at all exists as *some* sort of object whether m thical object individual thinker s object or object in outer space and for intelligence at large Errors, fictions tribal belief are parts of the whole great Universe which God has made and He must have meant all these things to be in t each in its respective place But for us finite creatures us to consider too curiously to consider so The mere fact of appearing as an object at all is not enough to constitute reality That may be metaphysical reality reality for God b t what we need is practical reality reality for oursel es and to ha e that an object must not only appear but it must appear both *interesti g* and *impor*

The w rld f dreams is ur real wo ld whilst w are sleeping because our ttention then lapses from the sensible world. Co versely when w wake the attention usually lapses from the dream-w d and that bec mes unreal. But if dream haunts us and compels ur tten tio during th day it is ery pt to remain figuring in ur consci usness as sort f sub-u rse alongside f the wakin w ld Most people ha e probably had dreams which it is hard to imagine t t have been glimpses into an actually existing region f being, perhaps corner f the "spiritual world. And dreams have ccordingly in all ages been regarded as revela ons, and have pla ed large part in furnishin f rth myth l gies and creating themes f faith t lay h ld upon Th larger universe here, which helps us t believe both in the dream and in the waking reality which is its immediat red ct e, is th t t l uni rse of Natur plus the upernat ural. The dream holds true namely in ne half f that universe the waking perceptions in th ther half E en to-day dream-objects figure mong the realities in which some "psychic-researchers are seeking t rouse ur belief. All our heories, not only those about the supernatural, but our philoso hic and scientific theories as well, are like our dreams in rousing such different degrees f belief in different minds.

tant The worlds whose objects are neither interesting nor important we treat simply negatively we brand them as *un*real

In the relative sense then the sense in which we contrast reality with simple *un*reality and in which one thing is said to have *more* reality than another and to be more believed *reality means simply relation to our emotional and active life* This is the only sense which the word ever has in the mouths of practical men *In this sense whatever excites and stimulates our interest is real* whenever an object so appeals to us that we turn to it accept it fill our mind with it or practically take account of it so far it is real for us and we believe it Whenever on the contrary we ignore it fail to consider it or act upon it despise it reject it forget it so far it is unreal for us and disbelieved Hume s account of the matter was then essentially correct when he said that belief in anything was simply the having the idea of it in a lively and active manner

> I say then that belief is nothing but a more vivid lively forcible firm steady conception of an object than the imagination alone is ever able to attain It consists not in the peculiar nature or order of the ideas but in the *manner* of their conception and in their *feeling* to the mind I confess that it is impossible perfectly to explain this feeling or manner of conception Its true and proper name is *belief* which is a term that everyone sufficiently understands in common life And in philosophy we can go no farther than assert that belief is something felt by the mind which distinguishes the idea of the judgment from the fictions of the imagination [1] It gives them more weight and influence makes them appear of greater importance enforces them in the mind gives them a superior influence on the passions and renders them the governing principle in our actions [2]

Or as Prof Bain puts it In its essential character belief is a phase of our active nature—otherwise called the Will [3]

The object of belief then reality or real existence is something quite different from all the other predicates which a subject may possess Those are properties intellectually or sensibly intuited When we add any one of them to the subject we increase the intrinsic content of the latter we enrich its picture in our mind But adding reality does not enrich the picture in any such inward way it leaves it inwardly as it finds it and only fixes it and stamps it in to *us*

> The real [as Kant says] contains no more than the possible A hundred real dollars do not contain a penny more than a hundred possible dollars By whatever and by however many predicates I may think a thing nothing is added to it if I add that the thing exists Whatever therefore our concept of an object may contain we must always step outside of it in order to attribute to it existence [4]

[1] Distinguishes realities from unrealities the essential from the rubbishy and neglectable

[2] *Enquiry concerning Human Understanding* sec v pt 2 (slightly transposed in my quotation)

[3] Note to James Mill s *Analysis* I p 394

[4] *Critique of Pure Reason* translated by F Max Muller Hume also Wh [illegible] aft the simple conception of anything we would conceive it as existent we in reality make no addition to or alteration of our first idea Thus when we affirm that God is existent we simply form the idea of such a being as He is represented to us nor is the existence which we attribute to Him conceived by a particular idea which we join to His other qualities, and can again separate and distinguish from them [illegible] The belief of the existence joins no new idea [illegible]

The stepping outs de of it is the establishment either of immediate practical relations between it and ourselves or of relations between it and other objects with which we have immediate practical relations Relations of this sort wh ch are as yet not transcended or superseded by others are *ipso facto* real re-l ns and confer reality upon their objective term *The fons et or go of all* *al point of view is thus subjec*

r
i
i
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m p

eu es -

i *f m ir ego thus su u* -
i
-
i *π nred i* -
i
-
self is either not believed or only believed after settled - -

We reach thus the important conclusion that *our own reality that sense of ou own life which we at every moment possess is the ultimate of ultimates for ou bel ef* As sure as I exist —this is our uttermost warrant for the being of all ther th gs As Descartes made the indubitable reality of the *cogito* go bail for the reality of all that the *cogito* invol ed so we all of us feelin our own p esent real ty with absolutely coerc e force ascr be an all but equal degree of i h th n s we lay h ld on with a sense of personal need

Mein
e Wirk

The world of living realities as contrasted with unrealit es is thus anchored n the E o considered as an acti e and emotional term That is the hook from h h the est dangles the absolute suppo t And as from a painted hook it has bee d th t one can only hang a painted chain so conversely f om a real h

powers noth ng touches us intimately rouses us or wakens natural feelin

t th se hich mpose th id as f th bj ct Wh I think f God wh I think f H m as xi t d h I beli Him t be xist t my dea f Him eith increase diminishes B t as 'tis certai th re is gre t differ betwixt th simpl pti f th existenc f an bject and th beli f f t, and as this diff en hes t in th f ts mpo ns f th id hich w co ei t f ll ws th t t m t lie in th manner hi h ncei t (*T at f H m* \ i pt. iii sec 7)

I use the t f th Eg here as mm nse uses t N thing is *pr j dg d* as to the results (bsenc f results) f ulteri tt mpts to analy th tion.

The consequence is the complaint so often heard from melancholic patients, that nothing is believed in by them as it used to be, and that all sense of reality is fled from life. *They are sheathed in india-rubber; nothing penetrates to the quick or draws blood, as it were.* According to Griesinger, "I see, I hear!" such patients say, "but the objects do not reach me, it is as if there were a wall between me and the outer world!"

In such patients there often is an alteration of the cutaneous sensibility such that things feel indistinct or sometimes rough and woolly. But even were this change always present, it would not completely explain the psychic phenomenon, which reminds us more of the alteration in our psychic relations to the outer world which advancing age on the one hand, and on the other emotions and passions, may bring about. In childhood we feel ourselves to be closer to the world of sensible phenomena; we live immediately with them and in them; an intimately vital tie binds us and them together. But with the ripening of reflection this tie is loosened, the warmth of our interest cools, things look differently to us, and we act more as foreigners to the outer world, even though we know it a great deal better. Joy and expansive emotions in general draw it nearer to us again. Everything makes a more lively impression, and with the quick immediate return of this warm receptivity for sense-impressions joy makes us feel young again. In depressing emotions it is the other way. Outer things, whether living or inorganic, suddenly grow cold and foreign to us, and even our favorite objects of interest feel as if they belonged to us no more. Under these circumstances, receiving no longer from anything a lively impression, we cease to turn towards outer things, and the sense of inward loneliness grows upon us. . . . Where there is no strong intelligence to control this *blasé* condition, this psychic coldness and lack of interest, the issue of these states, in which all seems so cold and hollow, the heart dried up, the world grown dead and empty, is often suicide or the deeper forms of insanity.[1]

The Paramount Reality of Sensations

But now we are met by questions of detail. What does this stirring, this exciting power, this interest, which some objects have, consist in? Which *are* those 'intimate relations' with our life which give reality? And what things stand in these relations immediately, and what others are so closely connected with the former that (in Hume's language) we 'carry our disposition' also on to them?

In a simple and direct way these questions cannot be answered at all. The whole history of human thought is but an unfinished attempt to answer them. For what have men been trying to find out, since men were men, but just those things: Where do our true interests lie—which relations shall we call the intimate and real ones—which things *shall we call living realities and which not?* A few psychological points can, however, be made clear.

Any relation to our mind at all, in the absence of a stronger relation, suffices to make an object real. The barest appeal to our attention is enough for that. Revert to the beginning of the chapter, and take the candle entering the vacant mind. The mind *was waiting for just some such object to make its* spring upon.

[1] Griesinger, *Mental D*[illegible] §§ 50, 98. [illegible] that an[illegible] experience gives us [illegible] of the truth of [illegible] the dependence of th[illegible]

I ~ and the candle is believed But when the candle appears at
1 f their rivalry and

compel belief As a rule we believe
thin if we only could When obj
cally they confl ct but little with
this chaotic manner we can believe is
jungle in w n rstitions conceptions and sensible
objects all
turn n in
become p
t ons are
wh ch a contrad cted object maintains itself in our belief s pr
eral qual ties which it must possess Of these the one which would be put first
by most people because it characterizes objects of sensation is its—

1 Coerciveness over attention or the mere power to possess consciousness then follow—

2 Liveliness o sens ble pun ency e pecially in the way of exc tin pleasure or pain

3 Stimulating effect upon the will i.e capacity to arouse active impulses the more instinct e the better

4 Emoti nal interest as object of lo e dread admiration desire etc.

5 Co gruity with certain favorite forms of contemplation—unity simplicity perma ence and the like

6 Independ nce of other causes and ts own causal importance

These characters run into each other Coerci eness is the result of liveliness emot onal i terest What is lively and interestin stimulates *eo ipso* the will holds of acti e impulses as well as of contemplative forms causal n

As a whole sensations are more lively and re jud ed more real than concep t ns things met with e ery hour more real than things seen once attributes pe ed whe awake more real than attributes percei ed in a dream But owing to the *d erse latio s co t acted by the arious objects with each o r* the s mple rule that the li ely and permanent is the real is often enough dis gu ed A conce ved thi may be deemed mo e real than a certain sensible th g if it only be intimately related to other sensible things more vi id p r ma nt or interesting than the fir t one. Concei ed molecular vibrations e are b the phys cist jud ed more real than felt warmth because so intimately elated to all those other facts of motion in the world wh ch he has made his spe

l k ly to be j dged mo e real than a permanent one f it be mo e interesting and exc t n Such is the ht of Saturn th ou h a telescope such are the oc casional ins ghts d ll m nat ns which pset ou hab tual ways of thought

But no mere floating conception no mere disconnected rarity ever displaces vivid things or permanent things from our belief A conception to prevail mu t *terminate* in the world of orderly sensible experience A rare phenomenon to dis place frequent ones *must belong with others more frequent still* The history of science is strewn with wrecks and ruins of theory—essences and principles fluids and forces—once fondly clung to but found to hang together with no facts of sense And exceptional phenomena solicit our belief in vain until such time as we chance to conceive them as of kinds already admitted to exist What science means by verification is no more than this that no object of conception shall be believed which sooner or later has not some permanent and vivid object of sensation for its *term* Compare what was said on pages 453–55 above

Sensible objects are thus either our realities or the tests of our realities Conceived objects must show sensible effects or else be disbelieved And the effects even though reduced to relative unreality when their causes come to view (as heat which molecular vibrations make unreal) are yet the things on which our knowledge of the causes rests Strange mutual dependence this in which the appearance needs the reality in order to exist but the reality needs the appearance in order to be known!

Sensible vividness or pungency is then the vital factor in reality when once the conflict between objects and the connecting of them together in the mind has begun No object which neither possesses this vividness in its own right nor is able to borrow it from anything else has a chance of making headway against vivid rivals or of rousing in us that reaction in which belief consists On the vivid objects we *pin* as the saying is our faith in all the rest and our belief returns instinctively even to those of them from which reflection has led it away Witness the obduracy with which the popular world of colors sounds and smells holds its own against that of molecules and vibrations Let the physicist himself but nod like Homer and the world of sense becomes his absolute reality again [1]

That things originally devoid of this stimulating power should be enabled by association with other things which have it to compel our belief as if they had it themselves is a remarkable psychological fact which since Hume s time it has been impossible to overlook

[1] The way in which sensations a e pitt d against systematized concepti ns an l n which the one or the othe then p eva l accord ng as th nsati n ar f lt by ou sel r m l known by repo t nt restingly illust at d at th p es nt day by th stat f publ c b b f about spi ituali t c phen mena Th e xist num ou n t v of m v m nt th ut *contact on the part of art cles of furn tu e nd th mat rial bject in tl p esen f* tain p ivileged individuals call d m diums Su h m v m nt vi lates ou m m nes and th whole system of accepted phys cal sci nc C n qu ntiv tl e s h h n t t e ther brand the na atives immed ately as l call the ph n m na llu ons f s ns pr duced by f aud or due to halluc nation But on who has actually se n uch a ph n m non under what s ems to h m uff ntly t st c n i t n will h ld t h s nsit l e pe r ence th ugh thick and th n en though th wh l f l nc of sci n h uld be nt n twain That man would be a w ak p nted atu i d d wh h uld all w ny fl bl wn gen ralities about th l b l t of the senses to be d ived to bully him out f l dh n n to what *for h m* was an indubitable expe en f ght A m n may e r in this ob t nacy sure en u h in any particular case But th p t that an mates him is that on which ultimately the v ry lif and health of Sci n e r t

The 1 dness o
and is co eyed, — Superstitious pe p
municatio with the primary one. eason that they eek fter types and ima es in
saints and holy men f r the same e them a mo inimate and trong conception
o der to enli en their devotion and n
of those exemplary li es. Now tis evident o e of the best relics a devotee could
procure would be the handiw rk f a saint and if his cl thes and furniture a e er
to be considered in this light, tis because th y were once t his disposal and were
m ed and affected by him in which respect they are connected with him by a
short r train of onsequences than any of those f om which we learn the reality of
his exist en e. This phen menon learly pro es that present imp ess n with a ela
tion f ca sation may enli en any dea, and consequently p oduce belief or assent
I h s been remar ed among the

I

influen Th e m es o
consid
tio u
th f
their
e t l t distant and imm t rial objects We shad w out th o j cts
sa they in sensible t pes and im es and ender them mo present t us by the
immed t p esen f these t pe than t is possibl for us to d merely by an intel-
lectual ew and contemplati n.

H me s cases are rather trivial and the things which associated sensible ob-
jects make us believe in are supposed by him to be unreal But all the more
man fest for that is the fact of their psychological influence. Who does not
r alize more the fact of a dead or distant friend s existence at the moment
w en a portrait letter garment or other material reminder of him is found?
Th wh le not on of him then grows pungent and speaks to us and hakes us
a manner unknown at other times In children s mind fancies and real ties
l e side by ide But howe er li ely their fancies may be they still gain help
f m association with reality The imaginati e child identifies its *dramatis per*
s th some d ll o other material object, and this evidently solidifies be-
l f l ttle as t may resemble what t is held to stand for A thin not too inter
est b its own real qual ties generally does the best service here The most
use l d ll I ever saw was a large cucumber in the hands of a little Amazonian
Ind a g l sh nursed it and washed t and rocked it to sleep in a hammock
and talked t t all da lon —there was no part in life which the cucumber did
not pla Sa s M T ylor

A imaginat hild will make a dog do d y for a horse, or a soldier f ep-
herd ud la t the objects e resemblan alm t disappears, and b t of wood may
be d agged bo t esemb ng a hip on the se or a coach on the road Here the

T eatis f H ma Natur bk. i, pt. iii, sec. 7

likeness of the bit of wood to a ship or coach is very slight indeed but it is a thing and can be moved about and is an evident assistance to the child in enabling it to arrange and develop its ideas Of how much use may be seen by taking it away and leaving the child nothing to play with In later years and among highly educated people the mental process which goes on in a child's playing with wooden soldiers and horses though it never disappears must be sought for in more complex phenomena Perhaps nothing in after life more closely resembles the effect of a doll upon a child than the effect of the illustrations of a tale upon a grown reader Here the objective resemblance is very indefinite yet what reality is given to the scene by a good picture Mr Backhouse one day noticed in Van Diemen's Land a woman arranging several stones that were flat oval and about two inches wide and marked in various directions with black and red lines These he learned represented absent friends and one larger than the rest stood for a fat native woman on Flinders Island known by the name of Mother Brown Similar practices are found among far higher races than the ill fated Tasmanians Among some North American tribes a mother who has lost a child keeps its memory ever present to her by filling its cradle with black feathers and quills and carrying it about with her for a year or more When she stops anywhere she sets up the cradle and talks to it as she goes about her work just as she would have done if the dead body had been still alive within it Here we have an image but in Africa we find a rude doll representing the child kept as a memorial Bastian saw Indian women in Peru who had lost an infant carrying about on their backs a wooden doll to represent it

To many persons among us photographs of lost ones seem to be fetishes They it is true resemble but the fact that the mere materiality of the reminder is almost as important as its resemblance is shown by the popularity a hundred years ago of the black taffeta silhouettes which are still found among family relics and of one of which Fichte could write to his affianced *Die Farbe fehlt das Auge fehlt es fehlt der himmlische Ausdruck deiner lieblichen Zuge* —and yet go on worshipping it all the same The opinion so stoutly professed by many that language is essential to thought seems to have this much of truth in it that all our inward images tend invincibly to attach themselves to something sensible so as to gain in corporeity and life Words serve this purpose gestures serve it stones straws chalk marks anything will do As soon as any one of these things stands for the idea the latter seems to be more real Some persons the present writer among the number can hardly lecture without a black board the abstract conceptions must be symbolized by letters squares or circles and the relations between them by lines All this symbolism linguistic graphic and dramatic has other uses too for it abridges thought and fixes terms But one of its uses is surely to rouse the believing reaction and give to the ideas a more living reality As when we are told a story and shown the very knife that did the murder the very ring whose hiding place the clairvoyant revealed the whole thing passes from fairy land to mother earth so here we believe all the more if only we see that the bricks are alive to tell the tale

So much for the prerogative position of sensations in regard to our belief But among the sensations themselves all are not deemed equally real The more practically important ones the more permanent ones and the more æsthetically

1 *Early History of M[ankind]* p 108

comprehensible ones are selected from the mass to be believed in most of all; the others are degraded to the position of mere signs and suggestions of these. This fact has already been adverted to in former chapters.[1] The real color of a thing is that one color-sensation which it gives us when most favorably lighted for vision. So of its real size, its real shape, etc.—these are but optical sensations selected out of thousands of others because they have æsthetic characteristics which appeal to our convenience or delight. But I will not repeat what I have already written about this matter, but pass on to our treatment of tactile and muscular sensations as "primary qualities," more real than those "secondary" qualities which eye and ear and nose reveal. Why do we thus so markedly select the *tangible* to be the real? Our motives are not far to seek. The tangible qualities are the least fluctuating. When we get them at all we get them the same. The other qualities fluctuate enormously as our relative position to the object changes. Then, more decisive still, the tactile properties are those most intimately connected with our weal or woe. A dagger hurts us only when in contact with our skin, a poison only when we take it into our mouths, and we can only use an object for our advantage when we have it in our muscular control. It is as tangibles, then, that things concern us most; and the other senses, so far as their practical use goes, do but warn us of what tangible things to expect. They are but organs of anticipatory touch, as Berkeley has with perfect clearness explained.[2]

Among all sensations, the *most* belief-compelling are those productive of pleasure or of pain. Locke expressly makes the *pleasure-* or *pain-*giving quality to be the ultimate human criterion of anything's reality. Discussing (with a supposed Berkeleyan before Berkeley) the notion that all our perceptions may be but a dream, he says:

"If he pleases to dream that I make him this answer, . . . that I believe he will allow a very manifest difference between dreaming of being in the fire and being actually in it. But yet if he be resolved to appear so sceptical as to maintain that what I call being actually in the fire is nothing but a dream, and that we cannot thereby certainly know that any such thing as fire actually exists without us, I answer, That we certainly finding that pleasure or pain [i.e. emotion of any sort] follows upon the application of certain objects to us, whose existence we perceive, or dream that we perceive, by our senses, this *certainty is as great as our happiness or misery*, beyond which we have no concernment to know or to be."[3]

[1] See pp. [illegible], p. 606 ff.

[2] See *Theory of Vision*, § 59.

[3] *Human Understanding*, bk. IV, chap. 2, § 14. In another place: "He that sees a candle burning, and hath experimented the force of its flame by putting his finger into it, will little doubt that this is something existing without him, which does him harm and puts him to great pain. . . . And if our dreamer pleases to try whether the glowing heat of a glass furnace be barely a wandering imagination in a drowsy man's fancy, by putting his hand into it, he may perhaps be wakened into a certainty greater than he could wish, that it is [illegible]

[illegible] ed with them. (*Ibid.* bk. IV, chap. [illegible], § 8.)

The Influence of Emotion and Active Impulse on Belief

The quality of arousing emotion, of shaking, moving us, or inciting us to action, has as much to do with our belief in an object's reality as the quality of giving pleasure or pain. In Chapter XXV I shall seek to show that our emotions probably owe their pungent quality to the bodily sensations which they involve. Our tendency to believe in emotionally exciting objects (objects of fear, desire, etc.) is thus explained without resorting to any fundamentally new principle of choice. Speaking generally, the more a conceived object *excites* us, the more reality it has. The same object excites us differently at different times. Moral and religious truths come 'home' to us far more on some occasions than on others. As Emerson says, 'There is a difference between one and another hour of life in their authority and subsequent effect. Our faith comes in moments; ... yet there is a depth in those brief moments which constrains us to ascribe more reality to them than to all other experiences.' The 'depth' is partly, no doubt, the insight into wider systems of unified relation, but far more often than that it is the emotional thrill. Thus, to descend to more trivial examples, a man who has no belief in ghosts by daylight will temporarily believe in them when, alone at midnight, he feels his blood curdle at a mysterious sound or vision, his heart thumping, and his legs impelled to flee. The thought of falling when we walk along a curbstone awakens no emotion of dread; so no sense of reality attaches to it, and we are sure we shall not fall. On a precipice's edge, however, the sickening emotion which the notion of a possible fall engenders makes us believe in the latter's imminent reality, and quite unfits us to proceed.

The greatest proof that a man is *sui compos* is his ability to suspend belief in presence of an emotionally exciting idea. To give this power is the highest result of education. In untutored minds the power does not exist. *Every exciting thought in the natural man carries credence with it. To conceive with passion is eo ipso to affirm.* As Bagehot says:

> 'The Caliph Omar burnt the Alexandrian Library, saying: "All books which contain what is not in the Koran are dangerous. All which contain what is in it are useless!" Probably no one ever had an intenser belief in anything than Omar had in this. Yet it is impossible to imagine it preceded by an argument. His belief in Mahomet, in the Koran, and in the sufficiency of the Koran, probably came to him in spontaneous rushes of emotion; there may have been little vestiges of argument floating here and there, but they did not justify the strength of the emotion, still less did they create it, and they hardly even excused it. ... Probably, when the subject is thoroughly examined, conviction will be found to be one of the intensest of human emotions, and one most closely connected with the bodily state ... accompanied or preceded by the sensation that Scott makes his seer describe as the prelude of a prophecy:
>
> *"At length the fatal answer came,*
> *In characters of living flame —*
> *Not spoke in words, nor blazed in scroll,*
> *But borne and branded on my soul."*
>
> A hot flash seems to burn across the brain. Men in these intense states of mind have altered all history, changed for better or worse the creed of myriads, and desolated or redeemed provinces or ages. Nor is this intensity a sign of truth, for it is precisely

strongest in thos points in which men dir r mo t from each other John Knox felt it in his anti-Cath licism Ignatius Loyola in his anti Pro estantism and both, I suppose felt it as much as t is possibl to feel it.

The reason of the belief is undoubtedly the bodily commotion which the exciting idea sets up Nothing which I can feel like *that* can be false All our religious and supernatural beliefs are of this order The surest warrant for immortality is the yearnin of our bowels for our dear ones for God the sinking sense it gives us to imagine no such Providence or help So of our political or pecuniary hopes and fears and things and persons dreaded and desired A grocer has a full creed as to foreign policy a young lady a complete theory of the sacraments as to which neither has any doubt. A girl in a country parsona e will be sure that Paris never can be taken or that Bismarck is a wretch —all because they ha e either conceived these things at some moment with pas s on, or associated them with other things which they have conceived with pass on

M Renou ier calls this belief of a thing for no other reason than that we ... *mental vertigo* Other objects whisper

... steady himself against ...

... the hailing of a conquero the burning of a witch the ... of ... foe—the ... a sufficient reason ...

The wh le history of witchcraft and early medicine is a commentary on the f lity with which anythin which chances to be conceived is believed the mome t the belief chimes in w th an emotional mood The cause of sickness? Whe a sa a e asks the cause of anythin he means to ask exclusi ely What is to blame The theoretic curiosity starts from the practical life s demands Let some one then accuse a necromancer suggest a charm or pell which has bee cast and no more e dence is asked for What evidence is requi ed be- d this int mate sense of the culprit s responsibility to which our very viscera and limbs reply?

W Bagehot "The Em ... f C ... iction, *Literary Studies* 1, pp 4 ... 7

P ... k logie ... le chap

Tw ... xamples ... t f ... h ... and

R id *I quiry* chap ii § 9 I ... member many years ... whit ... was brought int ... be ... f so enorm us siz that people cam many miles t see him. Th re h ppened, ... mo ths aft ... an unc mm ... f tal y am ng w men in child bearing Tw ... ch un ... omme ... nts, following ne anoth ... ga ... u picion f their connectio and occasi ed ... mmon ... pinion am ng the country pe ple that the white ... was the cause f this

H M Stanley *Thr ... gh th Dark C ... ent* ii, p 380 On th third day f ur tay ... M ... a feeling quit ... omf table amongst th people ... count f their fri dly bea ... ing, I began t write in my ... book th terms f articles in rder t imp ... my already ... ocabulary f nati ... rds. I had p oceeded nly f w min tes wh I bserved

Human credulity in the way of therape it h 1 ~ 1

ingly whatever remedy may be suggested is a spark on inflammable soil The mind makes its spring towards action on that cue sends for that remedy and for a day at least believes the danger past Blame dread and hope are thus the great belief inspiring passions and cover among them the future the present, and the past

These remarks illustrate the earlier heads of the list on pp 641-42 Which ever represented objects give us sensations especially interesting ones or incite our motor impulses or arouse our hate desire or fear are real enough for us. Our requirements in the way of reality terminate in our own acts and emotions our own pleasures and pains These are the ultimate fixities from which as we formerly observed the whole chain of our beliefs depends object hanging to

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strange commotion amongst the people who had been flocking about me and presently they ran away In a short time we heard war cries ringing loudly and shrilly over the table land. Two hours afterwards a long line of warriors were seen descending the table land and advancing towards our camp There may have been between five and six hundred of them. We on the other hand had made but few preparations except such as would justify us replying to them in the event of the actual commencement of hostilities But I had made many firm friends among them and I firmly believed that I should be able to avert an open rupture When they had assembled at about a hundred yards in front of our camp Safeni and I walked up towards them and sat down midway Some half dozen of the Mowa people came near and the shauri began

What is the matter my friends? I asked Why do you come with guns in your hands, ... ning to fight? Fight? fight us your friends! Tut!

... ur people saw you yesterday make marks on some ... l waste our goats will die our bananas ... done to you that you should ... sh to ... you wine each day Your people a e ... tro be Why is the Mundelé so wicked? We have gathered together to fight you if you do not burn that tara tara now before our eyes If you burn it we go away and shall be your friends ...

I was rummaging my book box I came across a volume of Shakspeare [Chandos edition] much worn and well thumbed and which was of the same size as my field book its cover was similar also and it might be passed for the field book provided that no one remembered its appearance too well I took it to them Is this the tara tara friends that you wish burned?

Yes yes that is it

Well take it and burn it or keep it

"M—m. No no no We will not touch it It is fetish You must burn it

!! Well let it be so I will do anything to please my good friends of Mowa

We walked to the nearest fire I breathed a regretful farewell to my genial companion which during my many weary hours of night had assisted to relieve my mind when oppressed by almost intolerable woes and then gravely consigned the innocent Shakespeare to the flames heaping the brush fuel over it with ceremonious care

"Ah h h breathed the poor deluded natives sighing ... There is no trouble now And something approaching to a cheer was shouted among them which terminated the episode of the burning of Shakespeare"

object as the bees in swarming hang to each other until, *de proche en proche* the supporting branch the Self is reached and held

Belief in Objects of Theory

our belief is governed by principles which are simp e en

and difficult may be their application to details *The concerned system to pass for true must at least include the reality of the sens ble objects in it by ex ple g them as effects on us if nothing more The system which includes the most of them and defi itely explains or pretends to explain the most of them* ceteris paribus *pre ail* It is needless to say how far mankind still is from ha in exco tated such a sy tem But the various materialisms idealisms and hylozoisms show with what industry the attempt is forever made It is con ceivable that several ri al theories should equally well include the actual order of our ser heir scheme much as the one-fluid and two-fluid theories of electri sciences *That the able to acco nt satis o y those wh ch appeal most urge tly to our æsthetic emo-*

an ...

A philosophy may be unimpeachable in other respects but eithe f two defects will be f tal t ts uni ersal acceptance. First ts ultimate principle mu t ot be one that essentially baffles and disappoints our dearest desi es and most ch rished powers

pain The is o p oblem f good.

But a second d w rse defect in a philosophy than that of co tradictin ur t p open t es is to gi e them Object whateve to press gain t A philosoph who prin p so in mmensurate with our mo t intimate powers as t deny them all levancy uni rsal ffairs as to annihilat thei m tives t o e bl w will be e en m unpopu than pessimism Better f ce the enemy than the eternal V d! This is h material m will always fail of uni ersal adoption howev well it may fuse hing int tomistic unity however clearly t may prophesy the future eternity f materiali m denies eal to the bj cts f almo t all the impulses which we most h ish The eal m g f the impulses t says is something which has emo tional est f us whatev But what is call d extradit n is quite as haracteristic

R tionali y Acti y and Faith, in the *Princ t Review* (July .8) pp. 64-69.

Human credulity in the way of therapeutics has similar psychological roots. If there is anything intolerable (especially to the heart of a woman), it is to do nothing when a loved one is sick or in pain To do anything is a relief Accordingly whatever remedy may be suggested is a spark on inflammable soil The mind makes its spring towards action on that cue sends for that remedy and for a day at least believes the danger past Blame dread and hope are thus the *great belief inspiring passions and cover among them the future* the present and the past

These remarks illustrate the earlier heads of the list on pp 641–42 Whichever represented objects give us sensations especially interesting ones or incite our motor impulses or arouse our hate, desire or fear are real enough for us Our requirements in the way of reality terminate in our own acts and emotions our own pleasures and pains These are the ultimate fixities from which as we formerly observed the whole chain of our beliefs depends object hanging to

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vancing towards our camp There may have been between five and six hundred of them. We on the other hand had m de but few preparations except such as would justify us replying to them in the event of the actual commencement of hostil ties But I had made many firm friends among them and I firmly believed that I should be able to avert an open rupture When they had assembled at about a hundred yards in front of our camp Safeni and I walked up towards them and sat down midway Some half dozen of the Mowa people came near and the hauri began

What is the matter my friends? I asked Why do you come with guns in your hands, in such numbers as though you were coming to fight? Fight? fight us your frien is! Tut! this is some great mistake surely

Mundele replied one of them our people saw you yesterday make marks on some T h d O ll waste our goats will die our bananas

have gathered together to fight you if you do not burn that tara tara now oei it If you burn it we go away and shall be your friends as heretofore

I told them to rest there and left Safeni in their hands as a pledge that I should return My tent was not fifty yards from the spot but wh le going towards it my brain was busy in devising some a t number of valua I was rummaging much v orn and was sim lar also its appearance too well I took t to them Is this the tara tara friends th t y — burned?

Y s yes that is it

Well take it and burn it or k p it

M—m N n no We will

"I! Well let it be so I w ll

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ago

man w ked j k t all trades th L con cious will perpetually call forth essays t th phil sophies. I ompatibility of the f tur w th thei desires and active tende es is f ct t most men a source of m re fixed disquietud than uncertainty tself W tness the ttempts t o m the 'problem of e il the 'mystery of pai Th o p blem of good.

levancy in un rsal ffairs as t annihilat thei m ti es at e blow will be en m unpopula than pessimism Better fa the enemy than th t rnal Vo d! This is h m t rial sm will always fail of uni ersal adopti n h weve well t m y fuse th g int an tomist c unity ho eve clea ly t may p phesy the f ture eternity F materialism den es eal t to th bj ct f almost all th impulses which we m t herish Th real m g f the impulses t says is somethi g which ha no emotional int est f us hates But hat is call d extradition s qu te as haract ri tic

R tionality Acti ty and Faith, in the *Princeton Re ew* (July 88) pp 64-69.

of our emotions as of our sense Both point to an Object as the cause of the present feeling What an intensely objective reference lies in fear! In like manner an enraptured man a dreary feeling man are not simply aware of their subjective states if they were the force of their feelings would evaporate Both believe there is outward cau e *why* they should feel as they do either It is a glad world! how good is life! or What a loathsome tedium is existence!

Any philosophy which annihilates the validity of the reference by explaining away its objects or translating them into terms of no emotional pertinency leaves the mind with little to care or act for This is the opposite condition from that of nightmare, but when acutely brought home to consciousness it produces a kindred horror In

deepest energies The monstrously lopsided equation of the universe and its knower which we postulate as the ideal of cognition is perfectly paralleled by the no less lopsided equation of the universe and the *doer* We demand in it a *character* for which our emotions and active propensities shall be a match Small as we are minute as is the point by which the Cosmos impinges upon each one of us each one desires to feel that his reac ion at that point is congruous with the demands of the vast whole that he balances the latter so to peak and is able to do what it expects of him But a his abilities to do lie wholly in the line of his natural propensities as he enjoys reaction with such emotions as fortitude hope rapture admiration earnest ness and the like and as he very unwillingly reacts with fear disgust de pair or doubt —a philosophy which should legitimate only emotions of the latter sort would

of all mentality to the type of reflex action Cognition in this view is but a fleetin moment a cross section at a certain point of what in its totality is a motor phe nomenon In the lower forms of life no one will pretend that cognition is anything more than a gui

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that which is immediately ministerial to practice yet the earlier claim is only post poned not effaced and the active nature asserts its rights to the end

If there be any truth at all in this view it follows that however vaguely a philosopher may define the ultimate universal datum he cannot be said to leave it unknown to us so long as he in the slightest degree pretends that our emotional or active atti tude towards it hould be of one sort rather than another He who says Life is real life is earnest however much he may peak of the fundamental mysteriou ne s of things gives a distinct definition to that mysteriousness by ascribing to it the right to claim from us the particular mood called eriou ness which means the willingness to live with energy though energy bring pain *The same is true of him who says that all* is vanity Indefinable as the predicate vanity may be *in se* it is clearly enou h some thing which permits anæsthesia mere e cape from suffering to be our rule of life. There is no more ludicrous incongruity than for agnostics to proclaim with one breath that the substance of things is unknowable and with the next that the thought of it should in pire us with admiration of its glory reverence and a willingness to

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Aft the emotio al and act ve needs come the intellectual and æsthetic ones The tw g t æsthet c principles of richness and of ease dominate our ntel lectual as w ll as our sensu us l fe And *ceteris parib s* no system which should t be rich s mple and harmo ous would have a chance of being chosen for be l ef f ich mple and ha m n us systems were also there Int the latte we

should unhesitatingly settle with that welcoming attitude of the will in which belief consists To quote from a remarkable book

> This law that our consciousness constantly tends to the minimum of complexity and to the maximum of definiteness is of great importance for all our knowled e. Our own activity of attention will th ... are to know and what ... nty not only will our ... but we shall strongly ... the things much simpler than they are For our thoughts about them will have a constant tendency to become as simple and definite as possible. Put a man into a perfect chaos of phe ... eelings—and if the man ... ould doubtless soon find ... which he would impute ... about him so as to imag ... vs of e ... lves are ... ied im ... rejudice ... nts are deter ... great measure by this law of least effort as it is found exemplified in our activity of attention The aim of the whole process seems to be to reach as complete and united a conception of reality as possible a conception wherein the greatest fulne s of data shall be combined with the greatest simplicity of conception The effort of consciousness seems to be to combine the greatest richness of content with the greatest definiteness of organization [1]

The richness is got by including all the facts of sense in the scheme the simplicity by deducing them out of the smallest possible number of permanent and independent primordial entities the definite organization by assimilatin these latter to ideal objects between which relations of an inwardly rational sort obtain What these ideal objects and rational relations are will require a separate chapter to show [2] Meanwhile enough has surely been said to justify the assertion made above that no general offhand answer can be given as to which objects mankind shall choose as its realities The fight is still under way Our minds are yet chaotic and at best we make a mixture and a compromise as we yield to the claim of this interest or that and follow first one and then another principle in turn It is undeniably true that materialistic or so called scientific conceptions of the universe have so far gratified the purely intellectual interests more than the mere sentimental conceptions have But on the other hand as already remarked they leave the emotional and active interests cold *The perfect object of belief would be a God or Soul of the World represented both optimistically and moralistically (if such a combination could be) and withal so definitely conceived as to show us why our phenomenal experiences should be sent to us by Him in just the very way in which they come* All Science and all History would thus be accounted for in the deepest and simplest fashion The very room in which I sit its sensible walls and floors and the feeling the air and fire within it give me no less than the scientific conceptions which I am urged to frame concerning the mode of existence of all these phenomena when my back is turned would then all be corroborated not de realized by the ultimate principle of my belief The World soul ends me just those

[1] J Royce *The Religious Asp ct f Philosophy* (B ton 1885) pp 31 57

[2] Chapt XXVIII

phenomena in order that I may react upon them and among the reactions is the intellectual one of spinning these conceptions What is beyond the crude experiences is not an *alternative* to them but something that *means* them for me here and now It is safe to say that if ever such a system is satisfactorily excogitated mankind will drop all other systems and cling to that one alone as real Meanwhile the other systems coexist with the attempts at that one and all being alike fragmentary each has its little audience and day

[illegible]

ter here were it not that a few additional words will set the truth in a still clearer light

Doubt

There is hardly a common man who (if consulted) would not say that things come to us in the first instance *as ideas* and that if we take them for realities it is because we *add something to them* namely the predicate of having also *real existence outside of our thought* This notion that a higher faculty than the mere *having* of a conscious content is needed to make us know anything real by its means has pervaded psychology from the earliest times and is the tradition of Scholasticism Kantism and Common sense Just as sensations must come as inward affections and then be extradited as objects of memory must appear at first as present unrealities and subsequently be projected backwards as past realities so conceptions must be *entia rationis* till a higher faculty uses them as windows to look beyond the ego into the real *extra* mental world —so runs the orthodox and popular account

And there is no question that this is a true account of the way in which many of our later beliefs come to pass The logical distinction between the bare thought of an object and belief in the object s reality is often a chronological distinction as well The having and the crediting of an idea do not always coalesce for often we first suppose and then believe first play with the notion

P f R y p ts this ll in d ussing d li m d th lity f t al w ld [illegible] How dost th kn w f t al lity? I t d f simply d plai ly a w in I m by th ext nal w ld i th fi t pla [illegible]

[illegible] … It [illegible] d bted W eed th m t much [illegible] t dispense w th th m. Sembla es f m tt may [illegible] t semblan [illegible] A psychic solipsism [illegible] has bee seri usly [illegible] —Ch pt rs ix d x (P f R) [illegible] th psy h l gy [illegible]

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> This law that our consciousness constantly tends to the minimum of complexity and to the maximum of definiteness is of great importance for all our knowledge. Our own activity of attention will th d rm are to know and what uty not only will our but we shall strongly ve the things much simpler than they are For our thoughts about them will have a constant tendency to become as simple and definite as possible Put a man into a perfect chaos of phenomena—sounds sights feelings—and if the man continued to exist and to be rational at all his attention would doubtless soon find for him a way to make up some kind of rhythmic regularity which he would impute to the things about him so as to imagine that he had discovered some laws of e quence in this mad new world And thus in every case where we fancy ourselves ure of a simple law of Nature we must remember that a great deal of the fancied sim plicity may be due in the given case not to Nature but to the ineradicable prejudice of our own minds in favor of regularity and simplicity All our thou hts are deter mined in great measure by this law of least effort as it is found exemplified in our activity of attention The aim of the whole process seems to be to reach as com plete and united a conception of reality as possible a conception wherein the greate t fulness of data shall be combined with the greatest simplicity of conception The ef fort of consciousness seems to be to combine the greatest richness of content with the greatest definiteness of organization [1]

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2 Ch pter XXVII

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I have now I trust shown sufficiently what the psychologic sources of the sense of reality are Certain postulates are given in our nature and whatever satisfies those postulates is treated as if real I might therefore finish the chapter here were it not that a few additional words will set the truth in a still clearer light

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frame the hypothesis and then affirm the existence of an object of thought. And we are quite conscious of the succession of the two mental acts. But these cases are none of them *primitive* cases. They only occur in minds long schooled to doubt by the contradictions of experience. *The primitive impulse is to affirm immediately the reality of all that is conceived.*[1] When we do doubt, however, in what does the subsequent resolution of the doubt consist? It either consists in a purely verbal performance, the coupling of the adjectives 'real' or 'outwardly existing' (as predicates) to the thing originally conceived (as subject); or it consists in the perception in the given case of *that for which these adjectives*, abstracted from other similar concrete cases, *stand*. But what these adjectives stand for we now know well. They stand for certain relations (immediate or through intermediaries) to ourselves. Whatever concrete objects have hitherto stood in those relations have been for us 'real,' 'outwardly existing.' So that when we now abstractly admit a thing to be 'real' (without perhaps going through any definite perception of its relations), it is as if we said 'it belongs in the same world with those other objects.' Naturally enough we have hourly opportunities for this summary process of belief. All remote objects in space or time are believed in this way. When I believe that some prehistoric savage chipped this flint, for example, the reality of the savage and of his act makes no direct appeal either to my sensation, emotion, or volition. What I mean by my belief in it is simply my dim sense of a *continuity* between the long-dead savage and his doings and the present world of which the flint forms part. It is pre-eminently a case for applying our doctrine of the 'fringe' (see p. 167). When I think the savage with one fringe of relationship, I believe in him; when I think him without that fringe, or with another one (as, e.g., if I should class him with 'scientific vagaries' in general), I disbelieve in him. The word 'real' itself is, in short, a fringe.

Relations of Belief and Will

We shall see in Chapter XXVI that will consists in nothing but a manner of attending to certain objects, or consenting to their stable presence before the mind. The objects, in the case of will, are those whose existence depends on our

[1] The leading fact in Belief, according to my view of it, is our primitive Credulity. We begin by believing everything; whatever is, is true. . . . The animal born in the morning of a summer day proceeds upon the fact of daylight; assumes the perpetuity of that fact. Whatever it is disposed to do, it does without misgivings. If in the morning it began a round of operations continuing for hours under the full benefit of daylight, it would unhesitatingly begin the same round in the evening. Its state of mind is practically one of unbounded confidence; but as yet it does not understand what confidence means.

The pristine assurance is soon met by the check of disagreeable experience, leading to new insight. To be thwarted and opposed is one of our earliest and most frequent pains. It develops the sense of a distinction between free and obstructed impulse; the unconsciousness of an open way is exchanged for consciousness. . . . We are now said properly to believe in what has never been contradicted, as we disbelieve in what has been once contradicted. We believe that after the dawn of day there is before us a continuance of light; we do not believe that this light is to continue for ever.

Thus the vital circumstance in belief is not to be contradicted—[illegible]. The number of repetitions counts for little in the process; we are as much convinced after ten as after fifty; we are more convinced by ten unbroken than by fifty for and one against. (Bain, *The Emotions and the Will*, pp. 511–12.)

tho ght, movements of our own body for example or facts which such movements executed in future may make real Objects of belief on the contrary are those which do not chan e according as we think regardin them. I will to get up early to-morrow morning I believe that I got up late yesterday mornin I will that my foreign bookseller in Boston shall procure me a German book and write to him to that effect I believe that he will make me pay three dollars for it when it comes etc Now the important thing to notice is that this difference between the objects of will and belief is entirely immaterial as far as the relation of the mind to them goes All that the mind does is in both cases the same it looks at the object and consents to its existence espouses it says it shall be my reality It turns to it in short in the interested active emotional way The rest is done by nature which in some cases *makes* the objects real which we think of in this manner and in other cases does not. Nature cannot chan e the past to suit our thinkin She cannot chan e the stars or the winds but she *does* change our bodies to suit our thinkin and through their instrumentality changes much besides so the great practical distinction between objects which we may will or unwill and objects which we can merely believe or disbelieve grows up and is of course one of the most important distinctions in the world Its roots however do not lie in psychology but in physiology as the chapter on Volition will abundantly make plain *Will and Belief in short mea n a certain re a tion between objects and the Self are two names for o e a d the same* PSYCHO-LOGICAL ... ns which arise concerning one are ques-

A practical observation may end this chapter If belief consists in an emotional reaction of the entire man on an object how *can* we believe at will We ... tions. Truly enou h a man cannot believe at will

We have often heard them but now they shoot into our lives they move us we feel their living force Such instantaneous beliefs are truly enough not to be achieved by will But *gradually* our will can lead us to the same results by a very simple method *we eed nly n cold blood* ACT *as if the th in quest on were real a d keep act g as if t were eal and it will nfall bly end by growing to ... with or l fe that t will become eal* It will become so knit

this is so well known in moral and religious education that I need say no more

Literature D Hume *T ... of H m Nature* pt. III, § VII–X. A. Bain *The Emotions and The Will* chapter B lief (also p ... II) J Sully *Sens ... and I lus ons* essay IV J Mill *Analysis of the Human Mind* chap. XI. Ch. R ... *Psych logie attentionelle*

vol II pt II and *Esqu sse d une class ficat on systématique des doctrines ph los ph q s* pt VI J H Newman *The Gra nar of Assent* J Venn *Some Cha acteristics of Be.ef* V Brochard *De l E es* pt II chap VI IX and *Revue pl ilosoph que* XXVIII, I E Rabier *Psycholo ie* chap XXI Appendix Ollé Laprune *La Cert tude morale* (1881) G F Stout On Genesis of Cognition of Physical Reality in *M nd* Jan 1890 J Pikler *The Psychology of tl e Bel f in Object ve Existence* (London 1890) —Mill says that we believe present sensations and makes our belief in all other things a matter of *association* w th these So far so good but as he makes no mention of emotional or volitional reaction Bain rightly char es him with treat ng belief as a purely intellectual state For Bain belief is rather an incident of our active life When a thing is such as to make us *act* on it then we believe it accordin to Bain But *how about past things or remote things upon which* no reaction of ours is pos ible? And how about belief in things which *check* action? says Sully who considers that we believe a thin only when the idea of it has an inherent tendency to approximate in character and intensity to a sen.ation It is bvious that each of these autl ors emphasizes a true aspect of the question My own account has sought to be more complete sensation associati n and active reaction all being acknowledged to be concerned The most compendious possible formula perhaps would be that *ou b l ef and atten t on* are the same fact For the moment what we attend to is reality attention is a motor reaction and we are o made that ensations *fo ce attention from us* On Belief and Conduct see an article by Leslie Stephen *Fo tn ghtly R* *a* July 1888

A set of facts have been recently brought to my attent on which I hardly know how to treat so I say a word about them in this footnote I refer to a type of experience which has frequently found a place amongst the Yes answers to the Census of Hallucinations and which is generally described by those who report it as an mpression of the presence of someone near them although no sensat on either of s ght hearing or touch is invol ed From the way in which this experience is p ken of by those who have had it it w uld appear to be an xtrem ly d finite and positive state of mind coupled with a bel ef in the reality of its object quite as strong as any direct sensation ever gives And yet *no* sensation *seems to be conn ct d with it at all Sometimes the person wh e nearness is thus impr ssed* is a known person dead or living sometimes an unknown one His attitude and situati n are often very definitely impressed and so sometimes (though n t by way of hearing) are words which he wishes to say

The ph nomenon w uld em to be due to a pure *con pt n* bec m ng satu ated with the sort of stinging urg ncy wh ch o d nailv nly n at ns l ing But I ann t t pe u le my elf that the urgency in question consists in con m tant motu n l and m t mpul The impression may c me qu t sudd nly and d part qu ckly it ma ca ry no m u nal suggest ns and wake no mot r c n equ nces beyond those involved in att nd ng t t Altogether the matter is somev hat paradoxical and no c nclus on can b come to until more definite data a e obtained

Perhaps the most curious case of the sort wh ch I have recen d is the f ll in The subject of the observati n Mr P is an exceptionally intelligent witness th ugh the w ds f the narrative are his w fe s

Mr P has all his life been the occasional subject of rather singular d lus ns o imp essions of va ious kinds If I had beli f n th x t n f lat nt o mbry fa ult th than the five senses I should expla n them on that g ound Be ng t tally b'nd his th perceptions ar abn rmally k n and d v l p d and g n th x t n t a u l n t sixth sense it would be only natu al that th s lso h uld be m a ut n h m th n others One of the most int sting f his exp ri n es in this l n was th f qu nt pp n ti n of a corpse some y ars ago wh ch may be w rth th tt nt n f y u C mm ttee n that subj ct At the time M P had a mus c ro m n B t n n Beac n St eet wh h u d to do s ve and prot ct d p act with l ttl nt upt on N w all n t was a very famil a u ence w th him h l n th n lst f k t f l a c l f d It t air uddenly upon hi fa e w th a pri kl ng sensati n t th t f h h wh n h turn f om the pian and a figu e wh h he kn to be d d w uld m la f g l th c ack of the door from w th ut flatt n ng t lf t qu th ugh and un l ut g to the human form It was f m ddl g d m n nd d w itself l ng th rpet n h l and knees but w th head thr wn back t ll t re ched th f upon wh h t t tch d tself It remained some mom nts but vanished always f Mr P spoke mad a deci d m ve ment

*The most sin-uar point in the occurren was ts freq t repetiti n. H might expect d betw tw d f cl ck and t cam al s h ralded by th am d

and salt These points wer all pe fectly distinct and in ariabl each time. If asked h w he percei ed th m h will answ h cann t t ll h amply kn w t and so t ly and so dis tinctl that t is impossibl t shake his pinio as t th exa t d tails f th man ppea ce. It uld eem th t in this d lusi f th senses h ally as h has er d ne in th ctual experie es f hi ex pt in th first tw y ars f childh d

On cr s-examinin, Mr P I uld t make t th t th e was anythin like vis al imaginati n l ed alth gh h was quit nable t d scr be in just what terms th false percepti was carried n. It seemed to be m re lik an intensely d finit c ncepti than anything lse cepti t which th f eling f pr nt ality was ttached, b t in o uch shape as easily t fall under th heads laid d wn in my text.

Chapter XXII

REASONING

WE talk of man being the rational animal and the traditional intellectualist philosophy has always made a great point of treating the brutes as wholly irrational creatures Nevertheless it is by no means easy to decide just what is meant by reason or how the peculiar thinking process called reasoning differs from other thought sequences which may lead to similar results

Much of our thinking consists of trains of images suggested one by another of a sort of spontaneous revery of which it seems likely enough that the higher brutes should be capable *This sort of thinking leads nevertheless to rational* conclusions both practical and theoretical The links between the terms are either contiguity or similarity and with a mixture of both these things we can hardly be very incoherent As a rule in this sort of irresponsible thinking the terms which fall to be coupled together are empirical concretes not abstractions A sun et may call up the vessel s deck from which I saw one last summer the companions of my voyage my arrival into port etc or it may make me think of solar myths of Hercules and Hector s funeral pyres of Homer and whether he could write of the Greek alphabet etc If habitual contiguities predominate we have a prosaic mind if rare contiguities or similarities have free play we call the person fanciful poetic or witty But the thought is a rule *is of matters taken in their entirety Having been thinking of one we find* later that we are thinking of another to which we have been lifted along we hardly know how If an abstract quality figures in the procession it arrests our attention but for a moment and fades into something else and is never very abstract Thus in thinking of the sun myths we may have a gleam of admiration at the gracefulness of the primitive human mind or a moment of disgust at the narrowness of modern interpreters But in the main we think less of qualities than of whole things real or possible just as we may experience them

The upshot of it may be that we are *reminded* of some practical duty we write a letter to a friend abroad or we take down the lexicon and study our Greek lesson Our thought is rational and leads to a rational act but it can hardly be called reasoning in a strict sense of the term

There are other shorter flights of thought single couplings of terms which suggest one another by association which approach more to what would commonly be classed as acts of reasoning proper Those are where a present sign *suggests an unseen distant or future reality Where the sign and what it sug*gests are both concretes which have been coupled together on previous occasions the inference is common to both brutes and men being really nothing more than association by contiguity A and B dinner bell and dinner have been experienced *in immediate succession Hence A no sooner* falls upon the

ones and the greater part of our human ... rt Our perceptions or recogni tions of what obj... of color and we s... skunk a faint sound is heard and we call it a railroad train ... needless for such inferences of sensations not presented form the staple and tissue of our perceptive life and our Chapter XIX was full of them illusory or veracious They have been called *unco scious inferences* Certainly we are com monly unconscious that we are inferring at all The s gn and the signified melt into what seems to us the object of a single pulse of thought *Immediate infer e ces* would be a good name for these simple acts of reasoning requiring but two terms were it not that formal logic has already appropriated the expression for a more technical use

Recepts'

I the e first and s mplest inferences the conclusion may follow so continu ously upon the sign that the latter is not discriminated or attended to as a separate object by the mind E en now we can seldom define the optical signs which lead us to infe the shapes and d stances of the objects which by their aid we so unhes tatingly perce ve The objects too when thus inferred are *general* objects The dog crossing a scent thinks of a deer in general or of another dog n ge eral not of a pa ticular deer or dog To these most primitive abstract objects Dr G J Romanes gives the name of *recepts* or *ge eric* ideas to distin guish them f om concepts and general ideas properly so called They are not analyzed or defined but only imag ned

It equires b t slight analysis f our rdin ry mental p o esses to p ove that all

and mbining is b re d as it w *fo* the sc ous g t not *by* him Rec pts ei d t is nly o c pt that requi e to b co e ed. If I am c si g t eet and hea behind me a s dden shout I d not equi to wait in o d r to p di t t my lf that the e s p bably a hansom-cab just about t run me down ry f this ki d, a d in tho ci um tances is o intimately assoc t d in my mind w th ts purpo that the idea which t es d not rise b the level of a ept and the d pti m em ts my part which that dea mmedi tely p mpts p formed w th ut any intelligent eff ct Y t the othe hand *they* are

I se need f assumin m than tw t rms in this so t f easoning—first, the sign and sec d th *thing inf rred* f m t. Eith may be mplex b t essentially t is b t A alli g p B and middl t rm is in l d M Bin t in his m t int llig t littl book, *La P y k logie d nement* maintains th t th thr t rms Th prese t sensa u ign mu t, ding t him first k f m th past an mag which es mbl t and fuse w th t and th things uggested inferred ar lw y th tigu us associat f this int m diat imag and t f th immediat sensat Th reade f Chapter XIX ill se why I d t bel in th 'im g in q esti as distinct psychi f ct.
M tal E l t M (889) chapt rs III and IV See esp cially pp 68–80, and lat pp 353 396

neither reflex actions nor instinctive actions they are what may be termed recep ual actions or actions depending on recepts[1]

How far can this kind of unnamed or non conceptional ideation extend? Dr Romanes asks and answers by a variety of examples taken from the life of brutes for which I must refer the reader to his book One or two of them how ever I will quote

Houzeau writes that while crossing a wide and arid plain in Texas his two do s suffered greatly from thirst and that between thirty and forty times they rushed down the hollows to search for water The hollows were not valleys and there were no trees in them or any other difference in the vegetation and as they were absolutely dry there could have been no smell of damp earth The dogs behaved as if they knew that a dip in the ground offered them the best chance of finding water and Houzeau has often witnessed the same behavior in other animals

Mr Darwin writes When I say to my terrier in an eager voice (and I have made the trial many times) Hi! hi! where is it? she at once takes it as a sign that some thing is to be hunted and generally first looks quickly all round and then rushes *into the nearest thicket to scout for any game but finding nothing she looks up into* any neighboring tree for a squirrel Now do not these actions clearly show th t she had in her mind a general idea or concept that some animal is to be discovered and hunted?[2]

They certainly show this But the idea in question is of an object *about* which nothing farther may be articulately known The thought of it prompts to ac tivity but to no theoretic consequence Similarly in the following example

Water fowl adopt a somewhat different mode of alighting upon land or even upon ice from that which they adopt when alighting upon water and tho e kinds which dive from a height (such as terns and gannets) never do so upon land or upon ice These facts prove that the animals have one recept answering to a solid surface and another answering to a fluid Similarly a man will not dive from a height over hard ground or over ice nor will he jump into water in the same way as he jumps upon dry land In other words like the water fowl he has two distinct recepts one of which answers to solid ground and the other to an unresisting fluid But unlike the water fowl he is able to bestow upon each of these recepts a name and thus to rai e them both to the level of concepts So far as the practical purposes of locomotion are con cerned it is of course immaterial whether or not he thu raises his recepts into con cepts but for many other purposes it is of the highest importance that he is ab e to do this[3]

In Reasoning We Pick Out Essential Qualities

The chief of these purposes is *predication* a theoretic function which though it always leads eventually to some kind of action yet tends as often as n t to inhibit the immediate motor response to which the simple inferences of which we have been peaking give ri e In reasoning A may sugge t B but B in stead of being an idea which is simply *obeyed* by us is an idea which suggests the distinct additional idea C And where the train of suggestion is one of rea soning distinctively so called as contra ted with mere revery or ass ociative equence the ideas bear certain inward relations to each other which we mu t proceed to examine with some care

[1] *Loc cit* p o [2] p s p 4

The result C yielded by a true act of reasoning is apt to be a thing voluntarily *sought* such as the means to a proposed end the ground for an observed effect or the effect of an assumed cause All these results may be thou ht of as con crete things but they are *not suggested immed ately by other concrete th ngs* as in the trains of s mply associative thou ht They are linked to the concretes n and these steps are formed by en

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stares at a fact in its entirety and remains helpless or gets stuck if it sug gests no concomita t or imilar the reasoner breaks it up and notices some one f its separate attributes This attr bute he takes to be the essential part of the whole fact before him This attribute has properties or consequences which the *fact* until then was not known to have but which now that it is noticed to con tain the attr bute it must have

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F rst *sagac ty* o the ability to discover what part M lies embedded in the whole S wh ch is befo e him

J Lo k Ess y H man U d t ndi g bk. n ch p n, § 3

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[1] *Loc cit* p o [2] p 5 [3] p 4

The result C yielded by a true act of reasoning is apt to be a thin voluntarily *sought* such as the means to a proposed end the ground for an observed effect or the effect of an assumed cause All these results may be thought of as con crete things but they are *not uggested i mediately by other concrete th ngs* as in the trains of simply associative thought They are linked to the concretes which precede them by intermediate steps and these steps are formed by *en eral characters* articulately denoted and expressly analyzed out A thing in ferred by reasoning need neither have been an habitual associate of the datum from which we infer it nor n ed it be imilar to it It may be a thing entirely un known to our previous experience something which no simple association of co cretes could ever have evoked The great difference in fact be ween that simpler kind of rational thinking which consists in the concrete objects of past experience merely uggesting each other and reasonin distinctively so called is this that whilst the empir cal thinking is only reproductive reasoning is productive An empirical or rule-of thumb thinker can deduce nothing from data with whose behavior and associates in the concrete he is unfamiliar But put a reasoner amongst a et of concrete objects which he has neither seen nor heard of before and with a little time if he is a good reasoner he will make such inferences from them as will quite atone for his ignorance Reasoning helps us out of unprecedented ituations—situations for which all our common associa t e wisdom all the education which we share in common with the beasts lea es us without resource

Let us make th s ability to deal ith NOVEL *data the technical d fferentia of easo g* This will sufficiently mark it out from common associative thinking and will immediately enable us to say just what peculiarity it contains

It conta ns a alysis a d abstract on Whereas the merely emp rical thinker

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J Lock Ess y H m U d t nding bk. iv chap ii, § 3.

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[1] *L c cit* p 50 [2] p 52 [3] p 74

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Let us make this ability to deal with NOVEL *data the technical differentia of reaso ing* This will sufficiently mark it out from common associative thinking and will immediately enable us to say just what peculiarity it contains

It contains analysis and abstraction Whereas the merely empirical thinker stares at a fact in its entirety and remains helpless or gets stuck if it suggests no concomitant or similar the reasoner breaks it up and notices some one of its separate attributes This attribute he takes to be the essential part of the whole fact before him This attribute has properties or consequences which the fact until then was not known to have but which now that it is noticed to contain the attribute it must have

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First *sagacity* or the ability to discover what part M lies embedded in the whole S which is before him

J Locke Essay Human Understanding bk iv ch xi, § 3.

Second *learning* or the ability to recall promptly M s consequences concomitants or implications [1]

If we glance at the ordinary syllogism—

M is P
S is M
S is P

—we see that the second or *minor premise* the *subsumption* as it is sometimes called is the one requiring the sagacity the first or major the one requiring the fertility or fulness of learning Usually the learning is more apt to be ready than the sagacity the ability to seize fresh aspects in concrete things being rarer than the ability to learn old rules so that in most actual cases of reasoning the minor premise or the way of conceiving the subject is the one that makes the novel step in thought This is to be sure not always the case for the fact that M carries P with it may also be unfamiliar and now formulated for the first time

The perception that S is M is a *mode of conceiving S* The statement that M is P is an *abstract or general proposition* A word about both is necessary

What Is Meant by a Mode of Conceiving

When we conceive of S merely as M (of vermilion merely as a mercury compound for example) we neglect all the other attributes which it may have and attend exclusively to this one We mutilate the fulness of S s reality Every real

[1] To be sagacious is to be a good observer J S Mill has a passage which is so much in the spirit of the text that I cannot forbear to quote it The observer is not he who merely sees the thing which is before his eyes but he who sees what parts that thing is composed of To do this well is a rare talent One person from inattention or attending only in the wrong place overlooks half of what he sees another sets down much more than he sees *confounding it with what he imagines or with what he infers* another takes note of the *kind* of all the circumstances but being inexpert in estimating their degree leaves the quantity of each vague and uncertain another sees indeed the whole but makes such an awkward division of it into parts throwing things into one mass which require to be separated and separating others which might more conveniently be considered as one that the *result is much the same sometimes even worse than if no analysis had been attempted at* all It would be possible to point out what qualities of mind and modes of mental culture fit a person for being a good observer that however is a question not of Logic but of the Theory of Education in the most enlarged sense of the term There is not properly an Art of Observing There may be rules for observing But these like rules for inventing are properly *instructions for the preparation of one s own mind for putting it into the state in* which it will be most fitted to observe or most likely to invent They are therefore essentially rules of self education which is a different thing from Logic They do not teach how *to do the thing* but how to make ourselves capable of doing it They are an art of strengthening the limbs not an art of using them The extent and minuteness of observation which may be requisite *and the degree of decomposition to which it may be necessary to carry the* mental analysis depend on the particular purpose in view To ascertain the state of the whole universe at any particular moment is impossible but would also be useless In making chemical experiments we do not think it necessary to note the position of the planets because experience has shown as a very superficial experience is sufficient to show that in such cases *that circumstance* is not material to the result and accordingly in the ages when men believed in the occult influences of the heavenly bodies it might have been unphilosophical to omit ascertaining the precise condition *of those bodies at the moment of the experiment.* (*Logic* bk iii chap vii § 1 *Cf* also bk iv chap ii.)

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the rest of t A man is such a complex fact But out of the complexity all that an army commissary picks out as important for his purposes is his property of eat ing so many pounds a day the general of marchin so many miles the chair maker of havin such a shape the orator of respondin to such and such feel ings the theatre manager of bein willing to pay just such a price and no more for an evening s amusement Each of these persons singles out the particular ide of the e t re man which has a bearing on *his* concerns and not till this side is distinctly and separately conce ed can the proper practical conclusions *for that reaso er* be drawn and when they are drawn the man s other attributes may be igno ed

All ways of conce vi g a concrete fact if they are true ways at all are equally true ways *Th e is no prope ty* ABSOLUTELY *essential to any one th ng* The same p operty which figu es as the essence of a thing on one occasion becomes a very nesse tial feature up n nother Now that I am writing it is essential that I once ve my paper as a su face for inscr ption If I failed to do that I should ha e to stop my work But if I w shed to l ght a fire and no other materials were by the essential way of concei ng the paper would be as combustible material and I need then have no thought of any of its other destinations It is really *all* that it is a combustible a writin surface a thin thin a hydrocarbonaceous thing a thing eight inches one way and ten another a thing just one furlong east of a certain stone in my ne ghbo s field an American th ng etc etc *ad i fi t m* Wh che er one of these aspects of ts bein I temporarily class it un de mak s me unjust to the oth r aspects But as I always am classing it under one a pect or another I am always unjust always partial always exclusive My excuse is necess ty—the necessity which my finite and practical nature lays

h t a bea by aiming not at his eye or heart but at him *generally* But we cannot m generally at the universe or if we do we miss our game Our scope is narrow and we must attack things p ecemeal ignoring the sol d fulness in wh ch the el me ts of Natu e exist and string ng one after another of them t gether in a serial way to su t our l ttle interests as they change from hour to hour In th s the partiality of one moment is partly atoned for by the different

sort of partiality of the next To me now writing these words emphasis and selection *seem to be the essence of the* human mind In other chapters other qualities have seemed and will again seem more important parts of psychology

Men are so ingrainedly partial that for common sense and scholasticism (which is only common sense grown articulate) the notion that there is no one quality genuinely absolutely and exclusively essential to anything is almost unthinkable A thing s essence makes it *what* it is Without an exclusive essence it would be nothing in particular would be quite nameless we could not say it was this rather than that What you write on for example—why talk of its being combustible rectangular and the like when you know that these are mere accidents and that what it really is and was made to be is just *paper* and nothing else? The reader is pretty sure to make some such comment as this But he is himself merely insisting on an aspect of the thing which suits his own petty purpose that of *naming* the thing or else on an aspect which suits the manufacturer s purpose that of *producing an article for which there is a vulgar demand* Meanwhile the reality overflows these purposes at every pore Our usual purpose with it our commonest title for it and the properties which this title suggests have in reality nothing sacramental They characterize *us more than they characterize the thing* But we are so stuck in our prejudices so petrified intellectually that to our vulgarest names with their suggestions we ascribe an eternal and exclusive worth The thing must be essentially what the vulgarest name connotes what less usual names connote it can be only in an accidental and relatively unreal sense [1]

Locke undermined the fallacy But none of his successors so far as I know have radically escaped it or seen that *the only meaning of essence is teleological and that classification and conception are purely teleological weapons of the mind* The essence of a thing is that one of its properties which is so *important for my interests* that in comparison with it I may neglect the rest Amongst those other things which have this important property I class it after this property I name it as a thing endowed with this property I conceive it and whilst so classing naming and conceiving it all other truths about it become to me as naught [2] The properties which are important vary from man to man and from hour to hour [3] Hence divers appellations and conceptions for the same thing

[1] Readers brought up on Popular Science may think that the mol cular structure of th ngs is their real essence in an absolute sense and that water is H O-H mor d eply and tr ly than it is a solvent of sugar or a slaker of thirst Not a wh t! It is *ll* of these things with equal reality and the only r ason why *f the he nist* t is H-O-H p ma ly and nl secondar ly the other things is that *f l p pos of d d l n and con p nd us d fi t on the* H-O-H aspect of it is the m r u eful one to bea n mind

[2] We find th at we take for g anted ir esi tibly that ea h kind [of th ng] h s s m ha ac ter which d stinguishes it from other class s Wh t is the foundat on f th s p stulate? What s the g ound of this a umpt on th t th mu t xi t a d fn ti n wh h e h ve nev s en and which perhaps no ne has se n n a at factory fo m? I ply th t ur conv ction that th r must ne ds be *hara t ti c ma k by h ch th ngs* an b d fined in words is founded up n th assumpt on of *th n y p b l ty f n ng* (W Whewell *H to y of S nt fic Id as* bk iii chap i § 9)

[3] I may quote a passage f m an article entitl d Th S nt ment of R t on lity pub l shed in vol iv of *M nd* 18 9 Wh t is a *on pt n?* It is a *t l log al t um nt* It is a partial aspect of a th g which *fo ou pu p* w ega d as t e *sential* a p t as the representative of the ent e th ng In c mp ri on w th this aspect what v th p pe ties and qualit es the thing m y have are unimp tant a id nts which we may without

But many objects of daily use—as paper, ink, butter, horse-car—have properties of such constant unwavering importance, and have such stereotyped names, that we end by believing that to conceive them in those ways is to conceive them in the only true way. Those are no truer ways of conceiving them than any others; they are only more important ways, more frequently serviceable ways.

So much for what is implied when the reasoner conceives of the fact S before him as a case of which the essence is to be M. One word now as to what is involved in M's having properties, consequences, or implications, and we can go back to the study of the reasoning process again.

What Is Involved in General Propositions

M is not a concrete or 'self-sufficient' as Mr. Clay would say. It is an abstract character which may exist embedded with other characters in many concretes. Whether it be the character of being a writin surface, of being made in America or China, of being eight inches square, or of being in a certain part of

... h th end we have in

b. me ignore. B t th essence, the
new A bstance lik il has as m
as O man cei es t as co
chemist thinks f t as h droc
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th temporary interests f th
in hi wn mind th discrimina
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man mbarkin l
g
B re th in th circumstances tha ...)
pose T pick t the right ones is th measure f th man. 'Milli ns,' sa s Hartmann
re t th phen men bef re genialer K f pounces on th concept. Th g nius is
impl h t wh m, when h pens his yes pon th world th 'right' chara ters are th
prominent es. Th fool is he who, with th same purposes as the genius, infallibly gets
his tten on tangled amid th ccidents.

Only f ne f ur purposes w re tself truer than an th could ne f ur co cepti ns
bec me th truer concepti T be truer purpose, h weve ur purpose must nf m
m re t some bsol t tandard f purpose in things t which ur p rposes ught t
rm This h that the whol doctrin f esse tial charact rs is intimat ly bound p w th
t leological iew f th world M terialism becomes self-c tradict ry when t denies tele-
l gy and y t in th same bre th calls t ms, tc., th ss tial f ts The w ld co ta s
consci usness as w ll as t ms—and th on must be written d wn as j t as esse tial as
th th in th bse ce f any declared purpose egarding them th creat part in
the bsence f any creator As far as we urselves go, th t ms are w rth m re f pur
poses f ded cti n, the consciousness f purposes f in.pirati n. W may fairly write the
Un rse in either w thus A ms-produci -c sci usness C sci s ess-p ced
b t ms. At ms al consci usness alon are precisely eq al m tilati ns f th
truth If with t believin in God, I still co tin t talk f what th world essentially
f m m h titled t d fin t as place in which my nose itches, as pla

God or wha kind ...
poses, is th t tal truth

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[2] We find that we take for granted irresistibly that each kind [of thing] has some character which distinguishes it from other classes What is the foundation of this postulate? What is the ground of this assumption that there must be a definition which we have never seen and which perhaps no one has seen in a satisfactory form? I reply that our conviction that there must needs be characteristic marks by which things can be defined in words is founded upon the assumption of *the necessary possibility of reasoning* (Whewell *History of Scientific Ideas* bk VIII chap I § 9)

[3] I may quote a passage from an article entitled The Sentiment of Rationality published in vol IV of *Mind* 1879 What is a *conception? It is a teleological instrument* It is a partial aspect of a thing which for our purpose we regard as its essential aspect as the representative of the entire thing In comparison with this aspect whatever other properties and qualities the thing may have are unimportant accidents which we may without

plac
conc
acter wh ch leads to the one sort of conclusion which
rary interest to attain

The *results* of reasoning may be hit upon by accident The tereoscope was actually a result of reasonin it is conceivable however that a man playin with pictures and mirrors mi dentally have hit upon it Cats have been known to open doors by pullir order could open the door a taught her to associate some of the closed door A reasoning man however would open the door by first ana lyzin the hindrance He would a certain what particular feature of the door was wron The lever e does not raise the latch sufficiently from its slot—case of insufficient elevation—raise door bodily on hin es! Or door sticks at top by friction against lintel—press it bodily down! Now it is obvious that a child or an idiot mi ht without this reasonin learn the *rule* for opening that particular door I remember a c h h m d s rvant had discovered would not go unless it were suppo method after many tion of the pendulum bob again the back educated man would have analy ed out in five minutes I have a student s lamp of which the flame v brates most unpleasantly unless the collar which bears the chimney be raised about a sixteenth of an inch I learned the remedy after much t h ident and now always keep the collar up with a small wed e

draw such to get at the essential property he may require in a figure The essence consists in some *elat o of the figure to the new lines* a relation not obvi ous at all until they are put in The geometer s sagacity lies in the invention of the new lines

Som times, t must be nfessed, th ce p rpose falls sh rt f easonin and th nl last h cares t reach is th bar min f th dat m. Wh t is that? is first q esti elati t any unkn wn thing And th ease w th which curios ty is q ched as soo as w ar ppli d w th any sort f nam t call th bject by is ridicu l us en gh T q t from an unp blished essay by f rm t dent f mm Mr R. W Bla k "Th simplest end which thin p dicat ca serv is th satis t f th desire f unit tself th m des th t th thing shall be th sam with m th g L Wh the th da when I mistook po trait f Sh kespear f f H wth m was

the mer satisf cti n, em tion, in piratio ca ght by m mentarily believin in it.

space this is always true of it Now we might conceive of this being a world in which all such general characters were independent of each other so that if any one of them were found in a subject S we never could be sure what others would be found alongside of it On one occasion there might be P with M on another Q and so on In such a world there would be no *general* sequences or coexistences and no universal laws Each grouping would be *sui generis* from the experience of the past no future could be predicted and reasoning as we shall presently see would be an impossibility

But the world we live in is not one of this sort Though many general characters seem indifferent to each other there remain a number of them which affect constant habits of mutual concomitance or repugnance They involve or imply each other One of them is a sign to us that the other will be found They hunt in couples as it were and such a proposition as that M is P or includes P or precedes or accompanies P if it prove to be true in one instance may very likely be true in every other instance which we meet This is in fact a world in which general laws obtain in which universal propositions *are* true and in which reasoning is therefore possible Fortunately for us for since we cannot handle things as wholes but only by conceiving them through some general character which for the time we call their essence it would be a great pity if the matter ended there and if the general character once picked out and in our possession helped us to no farther advance In Chapter XXVIII we shall have again to consider this harmony between our reasoning faculty and the world in which its lot is cast [1]

To revert now to our symbolic representation of the reasoning process

M is P
S is M
S is P

M is discerned and picked out for the time being to be the essence of the concrete fact phenomenon or reality S But M in this world of ours is inevitably conjoined with P so that P is the next thing that we may expect to find conjoined with the fact S We may conclude or infer P through the intermediation of the M which our sagacity began by discerning when S came before it to be the essence of the case

Now note that if P have any value or importance for us M was a very good character for our sagacity to pounce upon and abstract If on the contrary P were of no importance some other character than M would have been a better essence for us to conceive of S by Psychologically as a rule P overshadows the process from the start We are *seeking* P or something like P But the bare totality of S does not yield it to our gaze and casting about for some point in S to take hold of which will lead us to P we hit if we are sagacious upon M because M happens to be just the character which is knit up with P Had we wished Q instead of P and were N a property of S conjoined with Q we ought to have ignored M noticed N and conceived of S as a sort of N exclusively

Reasoning is always for a subjective interest to attain some particular conclusion or to gratify some special curiosity It not only breaks up the datum

[1] Compare Lotze *Metaphysik* §§ 58 67 for some instructive remarks on ways in which the world s constitution might differ from what it actually is Compare also Chapter XXVIII.

it must conceive it *rightly* too and

rary interest to attain

The *results* of rea_onin_ may be hit upon by accident The stereoscope was actually a result of reasoning it is conceivable however that a man playing with p ctures and mirrors mi ht accidentally have hit upon it Cats have been known to open doors by pullin latches etc But no cat if the latch got out of order could open the door again unless some new accident of random fumbling taught her to assoc tot l movement with the total phenomenon of the closed door lyzin the hindranc wron The lever e door bodily on hinges! Or door sticks at top by insufficient elevation—raise t bod ly down! Now it is obvious that a child or an idiot might without t door I remember a cloc unless it were supportec method after many we tion of the pendulum bob against the back educated man uld have analyzed out in five minutes I have a student s lamp of which the flame brates most unpleasantly unless the collar which bears the ed about a s teenth of an nch I learned the remedy after much

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S m times t mu_t b fess d th ce p rpose f lls sh rt f ea m and the nl clasi h ca es t each is th b ming f th datum. Wh t is that? is ur fi t q e clat t any unkn n th g And th ease with which curi sity is q enched as soo as w re ppli d w th any sort f nam t call th bject by ridi l h T q t f m an unp blish d essay by f rm t dent f min M R W Bl ck Th mpl t d which thin p dicat an serv is th satisf cti f th des re f nit ts lf th m desir th t th th g sh ll b th sam with *m thi* g lse. Wh th th d when I must k po trait f Sh kespe f f H wth rne, was l psych l _ical principles, as ri_ht as if I h d rr ctly nam d t?—th tw pictures had comm essence bald f head must ch fl in hair S mply becaus th only d th t uld po sibl be serv d by ming t Hawth rn was my desi t h t W th f re any th d th t classificati f t w uld t erv A d ri nity ry id t rv l ssificati is rightly call d f ciful nless t serv som th d than th me satisf cti n, em ti n, in_piratio ca_ht by m m tarily b lieving in t.

Thus There Are Two Great Points in Reasoning

First an extracted character is taken as equivalent to the entire datum from which it comes and

Second the character thus taken suggests a certain consequence more obviously than it was suggested by the total datum as it originally came Take them again successively

1 Suppose I say when offered a piece of cloth I won t buy that it looks as if it would fade meaning merely that something about it suggests the idea of fading to my mind —my judgment though possibly correct is not reasoned but purely empirical but if I can say that into the color there enters a certain dye which I know to be chemically unstable and that *therefore* the color will fade my judgment is reasoned The notion of the dye which is one of the parts of the cloth is the connecting link between the latter and the notion of fading So again an uneducated man will expect from past experience to see a piece of ice melt if placed near the fire and the tip of his finger look coarse if he views it through a convex glass In neither of these cases could the result be anticipated without full previous acquaintance with the entire phenomenon It is not a result of reasoning

But a man who should conceive heat as a mode of motion and liquefaction as identical with increased motion of molecules who should know that curved surfaces bend light rays in special ways and that the apparent size of anything is connected with the amount of the bend of its light rays as they enter the eye —such a man would make the right inferences for all these objects even though he had never in his life had any concrete experience of them and he would do this because the ideas which we have above supposed him to possess would mediate in his mind between the phenomena he starts with and the conclusions he draws But these ideas or reasons for his conclusions are all mere extracted portion or circumstances singled out from the mass of characters which make up the entire phenomena The motions which form heat the bending of the light waves are it is true excessively recondite ingredients the hidden pendulum I spoke of above is less so and the sticking of a door on its sill in the earlier example would hardly be so at all But each and all agree in this that they bear a *more evident relation* to the conclusion than did the immediate data in their full totality

The difficulty is in each case to extract from the immediate data that particular ingredient which shall have this very evident relation to the conclusion Every phenomenon or so called fact has an infinity of aspects or properties as we have seen amongst which the fool or man with little sagacity will inevitably go astray But no matter for this point now The first thing is to have seen that every possible case of reasoning involves the extraction of a particular partial aspect of the phenomena thought about and that whilst Empirical Thought simply associates phenomena in their entirety Reasoned Thought couples them by the conscious use of this extract

2 And now to prove the second point Why are the couplings conse

quences and implications of *extracts more* evident and obvious than those of entire phenomena? For two reasons

First the extracted characters are more general than the concretes and the connections they may have are therefore more familiar to us having been more often met in our experienc Th k of heat as motion and whatever is true of motion will be true of heat
tion for every one of heat Thin
towards the perpendicular and
lens the very familiar notion
which notion e ery day brings us countless examples

The other reason why the relations of the extracted characters are so evident is that their p operties are so *few* compared with the properties of the whole from which we der ved them In every concrete total the characters and their consequences are so inexhaustibly numerous that we may lose our way amon them before noticing the particular consequence it behooves us to draw But if we are lucky enough to sin le out the proper character we take in as it were by a sin le glance all its poss ble consequences Thus the character of scraping the sill has ery few suggestions prominent among which is the suggestion that the scraping will cease if we raise the door whilst the entire refractory door sug gests an enormous number of notions to the mind

Take another example I am s tting in a railroad-car waiting for the train to tart It is winter and the sto e fills the car with pungent smoke The brakeman enters and my neighbor asks him to stop that stove smoking He replies that it will stop entirely as soon as the car begins to move Why so? asks the passen It always does replies the brakeman It is evident from this always

have anticipated the brakeman s reply and spared his own question Had he singled out of all the numerous points involved in a stove s not smoking the one pecial point of smoke pouring freely out of the stove-pipe s mouth he would probably owing to the few assoc ations of that idea have been immediately rem ded of the law that a flu d passes more rapidly out of a p pe s mouth if an othe flu d be at the same time st eamin over that mouth and then the rapid draught of air over the stove-pipe s mouth which is one of the points involved n the car s motion would immediately have occurred to him

Thus a co ple of extracted characters with a couple of their few and obvious nnections would ha e formed the reasoned link in the passen er s mi d between the phenomena smoke stopping and car movin which were only linked as wholes in the b akeman s mind Such examples may seem trivial but they contain the essence of the most refined and transcendental theorizin The rea son why phys cs grows more deduct e the more the fundamental p operties it assumes are of a mathematical sort such as molecular mass or wave-length is that the immediate consequences of these notions are so few that we can survey them all at once and promptly p ck out those which concern us

Sagacity or the Perception of the Essence

To reason then we must be able to extract characters —*not any characters* but the right characters for our conclusion If we extract the wrong character it will not lead to that conclusion Here then is the difficulty *How are characters extracted and why does it require the advent of a genius in many cases before the fitting character is brought to light?* Why cannot anybody reason as well as anybody else? Why does it need a Newton to notice the law of the squares a Darwin to notice the survival of the fittest? To answer these questions we must begin a new research and see how our insight into facts naturally grows

All our knowledge at first is vague When we say that a thing is vague we mean that it has no subdivisions *ab intra* nor precise limitations *ab extra* but still all the forms of thought may apply to it It may have unity reality exter nality extent and what not—*thinghood* in a word but thinghood only as a whole [1] In this vague way probably does the room appear to the babe who first begins to be conscious of it as something other than his moving nurse It has no subdivisions in his mind unless perhaps the window is able to attract his separate notice In this vague way certainly does every entirely new experience appear to the adult A library a museum a machine-shop are mere confused wholes to the uninstructed but the machinist the antiquary and the bookworm perhaps hardly notice the whole at all so eager are they to pounce upon the details Familiarity has in them bred discrimination Such vague terms as grass mould and meat do not exist for the botanist or the anatomist They know too much about grasses moulds and muscles A certain person said to Charles Kingsley who was showing him the dissection of a caterpillar with its exquisite viscera Why I thought it was nothing but skin and squash! A layman present at a shipwreck a battle or a fire is helpless Discrimination has been so little awakened in him by experience that his consciousness leaves no single point of the complex situation accented and standing out for him to begin to act upon But the sailor the fireman and the general know directly at what corner to take up the business They see into the situation —that is they analyze it—with their first glance It is full of delicately differenced ingredients which their edu cation has little by little brought to their consciousness but of which the novice gains no clear idea

How this power of analysis was brought about we saw in our chapters on Dis crimination and Attention We dissociate the elements of originally vague totals by attending to them or noticing them alternately of course But what deter mines which element we shall attend to first? There are two immediate and ob vious answers first our practical or instinctive interests and second our æs thetic interests The dog singles out of any situation its smells and the horse its sounds because they may reveal facts of practical moment and are instinctively exciting to these several creatures The infant notices the candle flame or the window and ignores the rest of the room because those objects give him a vivid pleasure So the country boy dissociates the blackberry the chestnut and the wintergreen from the vague mass of other shrubs and trees for their practical uses and the savage is delighted with the beads the bits of looking glass

[1] See above p 4 6

brought by an explorin vessel and gives no heed to the features of the vessel itself which is too much beyond his phere These æsthetic and practical interests then are the weightiest factors in makin particular ingredients stand out in hi h relief What they lay their accent on that we notice but what they are in themselves we cannot say We mu t content ourselves here with simply accepting them as irreducible ultimate factors in determinin the way our knowledge grow

1

ciate va tly more characters than any other animal and ...
that the lowe t sava es reason incomparably better than the highest brutes The d verse intere ts lead too to a divers fication of experiences whose accumula t on becomes a condition for the play of that *law of dissociation by varying concom ta ts* of which I treated in a former chapter (see p 326)

The Help Gi en by Association by Similarity

It is p obable also that man s *superior association by similarity* has much to d w th tho e discriminations of character on which his h gher flights of reason ing a e based As this latter is an important matter and as little or nothin was said of it in the chapter on Discrimination it behooves me to dwell a little upon it h re

What does the reader do when he wishes to see in what the preci e likeness or d ffe ence of tw objects lies He transfers his attention as rapidly as possible b ckwards and forwards from one to the other The rapid alteration in con sc u ess shakes out as it were the points of difference or agreement wh ch w ld ha e slumbe ed fore er unnoticed if the consciou ness of the objects compared had occurr d at w dely distant periods of time What does the scientific man do who searches for the reason or law embedded in a phenomenon? He de l berately accumulates all the instances he can find which have any analogy to

h form exper ence by all of those with wh ch he now at once confronts it These examples show that the mere general fact of having occurred at some tim n one s experienc with varying concomitants is not by tself a sufficient easo fo a character to be dissociated now We need somethin more *we need* that the varyin concomitants should n all the r variety be b ought into con sc ness *at e* Not t ll then will the character in question escape from its dh to each and all f them and stand alone This will immediately be rec ogn zed by those wh ha e read Mill s *Log c* as the ground of Utility in his fa

and strike the mi d

Now it is obvious that any mind in which association by similarity is highly developed is a mind which will spontaneously form lists of instances like this Take a present case A with a character *m* in it *The mind may fail at first to* notice this character *m* at all But if A calls up C D E and F —these bein phenomena which resemble A in possessing *m* but which may not have entered *for months into the experience of the animal who now experiences A*—why plainly such association performs the part of the reader s deliberately rap d comparison referred to above and of the systematic consideration of like cases by the scientific investigator and may lead to the noticing of *m* in an abstract way Certainly this is obvious *and no conclusion is left to us but to assert that* after the few most powerful practical and æsthetic interests our chief help towards noticing those *special characters* of phenomena which when once possessed and named are used as reasons class names essences or middle terms *is this association by similarity* Without it indeed the deliberate procedure of the scientific man would be impossible he could never collect his analogous instances But it operates of itself in highly gifted minds without any deliberation *spontaneously* collecting analogous instances uniting in a moment what in nature the whole breadth of space and time keeps separate *and so permitting a perception of identical points in* the midst of different circumstances which minds governed wholly by the law of contiguity could never begin to attain

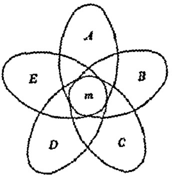


Fig 80

Figure 80 shows this If m in the present representation A calls up B C D and *E* which are similar to *A* in possessing it and calls them up in rapid succession then *m* being associated almost simultaneously with such varying concomitants will roll out and attract our separate notice

If so much is clear to the reader he will be willing to admit that the mind *in which this mode of association most prevails* will from its better opportunity of extricating characters be the one most prone to reasoned thinking *whilst on* the other hand a mind in which we do not detect reasoned thinking *will prob*ably be one in which association by contiguity holds almost exclusive sway

Geniuses are by common consent considered to differ from ordinary *minds* by an unusual development of association by similarity One of Professor Bain s best strokes of work is the exhibition of this truth[1] It applies to geniuses in the line of reasoning as well as in other lines And as the genius is to the vulgarian so the vulgar *human mind* is to the intelligence of a brute Compared with men it is probable that brutes neither attend to abstract characters nor have associations by similarity Their thoughts probably pass from one concrete object to its habitual *concrete successor far more* uniformly than is the case with us In other words their associations of ideas are almost exclusively by contiguity It will clear up still farther our understanding of the reasoning process if we devote a *few pages to*

[1] See his *St dy of Cl a act* ch p xv al o in *Th e S n ard th Int ll ct* Intell ct chap ii the l tter h lf

The Intellectual Contrast Between Brute and Man

I will first try to show by taking the best stories I can find of animal sagacity that the mental process involved may as a rule be perfectly accounted for by mere cont g h ed n experience. Mr Darwin in his *Descent of Man* ins
dr win a
some an exercise of reason ue
kimo dogs that ever lived act so when placed upon ice for the first time together? A band of men from the tropics m ght do so easily Recognizing cracking to be a n of breaking and seizing immediately the partial character that the point of ruptu e is the point of greatest strain and that the massing of weight at a given point concentrates there the strain a Hindoo mi ht quickly infer that scatter m l and h cryin out to his comrades to disperse save

observed t to cease when they scatte ed Naturally therefore the sound would edintegrate all these former experiences includin that of scatterin which latter the would promptly renew It would be a case of immediate suggestion r of that Logic of Recepts as Mr Romanes calls it of which we spoke above o p 665

A frie d of the writer gave as a proof of the almost human intelligence of his do that he took him one day down to his boat on the shore but found the boat full of dirt and water He remembered that the sponge was up at the house a th d f a mile distant but, disliking to go back himself he made various ges t res of wipin out the boat and so forth saying to his terrier Spon e sponge

t rest in the boat-cleaning operation nor noticed what the spon e was for The terrier in ha in p cked those details out of the crude mass of his boat per ence distinctly enough to be reminded of them was truly enou h ah ad of his peers on the line which leads to human reason But his act was not yet an act

apacity t take up water and had reflected For the p esent purpose they are d t cal This which the do did not do any man but the very stupidest could not fail to do

If the reader will take the trouble to analyze the best do and elephant stories he knows h will find that, in most cases this simple contiguous calling up of whole by another is quite sufficient to explain the phenomena Sometimes

it is true we have *to suppose the recognition of a property or character* as such but it is then always a character which the peculiar practical interests of the animal may have singled out A dog noticing his master s hat on its pe may possibly infer that he has not gone out Intelligent dogs recognize by the tone of the master s voice whether the latter is angry or not A dog will perceive whether you have *kicked him by accident or by design and behave accordin ly The* character inferred by him the particular mental state in you however it be represented in his mind—it is represented probably by a recept (p 665) or set of practical tendencies rather than by a definite concept or idea—is still a partial character extracted from the totality of your phenomenal being and is his *reason for crouching and skulking* or playing with you *Dogs* moreover *seem* to have the feeling of the value of their master s personal property or at least a particular *interest* in objects which their master uses A dog left with his master s coat will defend it though never taught to do so I know of a dog accustomed to swim after sticks in the water but who always refused to dive for stones *Nevertheless when a fish basket which he had never been trained to* carry but merely knew as his master s fell over he immediately dived after it and brought it up Dogs thus discern at any rate so far as to be able to act this partial character of *being valuable* which lies hidden in certain things [1] Stories

[1] Whether the dog has the notion of your being angry or of your property being valuable *in any such abstract way as we l ave these notions is more than doubtful The conduct* t more likely an impulsive result of a conspiracy of outward stimuli the beast *f l l k* act ng so when these st muli are pr sent though con cious of no definite r ason why The distinc *tion of recept and c nc pt is us ful he e Some breeds of d gs e g collies* seem instinctiv ly to defend their ma ters property The case is similar to that of a dog s barkin at people after dark at whom he would not bark in daylight I have hea d this quoted as ev d nce of the do s reasoning power It is only as Chapter xx has shown us the impulsive result of a summation of stimuli and has no conn cti n w th r ason ng

In certain stages of the hypnotic trance the subject seems to lapse into the non analytic state If a she t of ruled fools ap pap r or a paper ith a f ne mon tonous ornamental pattern printed on it be shov n to the ubject and *on* of the rul d lines or el ments of the *pattern be po nt d to for an instant and the paper mm diately remov d he* w ll then almost always when after a short interval the paper s present d to him aga n pick ut the indicated line or element with infallible correctness The operato m n while has either to ke p his eye f xed upon it or to make sure of its p sition by count ng in ord not to lose its place Just so we may remember a f iend s hou e in a stre t by the s ngle ch racter of its number rather than by its general look The trance subject would seem *in th e nstances* to su r nd r himself to the g neral look H disperses his att ntion impa tially over the sheet The pla e of the pa ti ular lin t uch d s pa t f a total ff ct which he gets n its entir ty and wh ch would be d *to ted if nothe l ne w r tou hed nst ad* Thi tot l ff t is lost up n the no mal look n b nt s h is on conc nt ation analysis and mph si What wond then that under th s exp r m ntal ond tions the t anc ubj t exc *ls h m in touch ng the right line again?* If h has t m given h m to c unt the l n h w ll ex l the tranc subject but if the tim be too sh t to c unt h will b t suc ed by f llowing the trance metl od ab taining fr m analys s and b ng guided by the g n al lo k f th l s place on the sh t One is surp ised at on s su c ss n this the moment one giv up on s hab tually analytic tate f m nd

Is it too much to say that we have in th s d per n of the attention and subj cti n to th general effect s m th ng like a r lap into th t t of mind of brut ? Th t an subj ct never g v s any othe reason f r h*i* pt l d m nat n *se th t t l* ks so S a man on a road once t a d natt nt ly b f t h s a c ta n turn f no n c pt that he *fe l* as if it mu t b ht H is gu d d by a sum f imp s ns n t one of wh ch is emphatic or distinguished f om the r st n t ne of wh h s ss nt al n t ne f h ch is c *nc ved* but all of which t g th r drive h m to a c n lu n to wh ch nothing but *that*

t hims and it is said that

t r d the character of duality and the t th nkin Another story told to

and found b ting and tug ing at the hand into a stump The wedge could not be foun the dog must have had a clear perception pl t which was in ol ed in both the instru respect, inferred their identity for the purposes requ red

It cannot be den ed that this interpretation is a possible one but it seems to me far to transcend the limi f d ary canine abstraction The property in quest on was not one which l of belongin to his master a the po ge story had returned more remarkable It seems more probable therefore that this wood cutter s dog had also been accustomed to carry the axe and now excited by the vain hunt f r the wed e had discharged his carrying powers upon the former instrument in a so t of confusion—just as a man may pick up a sieve to carry water in in th excitement of puttin out a fire

Thus then the characters extracted by animals are very few and always related to the r immediate interests or emotions That dissociation by varying con om tants which in man is based so lar ely on association by sim larity hardly seems to take place at all in the mi d of brutes One total thought suggests to the another total thought and they find themselves acting with propriety they know not why The great the fundamental defect of their minds seems to be the inability of their groups of ideas to break across in unaccustomed places

h ing the ffect S th t f th (f h m) ssc tial feat b f g it chang d h is t pt t b th n ff lt g ther and th the brut th tran bj ct may m t tstrip h m in sag city

D R manes l dy q t d d tin ti betw ptu l d cept al th ht (p l lish d sin th body f my text and my t w writt) c tes ent tly th diff which I se k t p int t S also his *M tal E l t M* p 97 ff f p oof f th f t that in ec pt al w y brutes gnu th mental t tes f th brut d men

Th matt f f is mporta t d int ting Since nfus is mistakin th w g part f th ph men f th h l whilst reas nin is ding t d fin t based th bstit ti f th right p rt f th wh le, t m ght b said th t f and reaso ing ar gen lly th sam p ess. I beli th t th y and that th ly differen bet en m ddl h d d g m is th t b tw extr ti g w g ch cters and right es In ther w ds, m ddl b d d perso is gen sp l d in th making I think t will be dmitted th t all m ently m ddl h d d p rs ns b th t m pe ament f g nius. They constantly b eaking y f m th al ns cuti f co es. A mm associa by tiguity is t l ly ti d t tin t g t m ddl h d d.

They are enslaved to routine to cut and dried thinking and if the most prosaic of human beings could be transported into his dog s mind he would be appalled at the utter absence of fancy which reigns there [1] Thoughts will not be found to call up their similars but only their habitual successors Sunsets will not suggest heroes deaths but supper time This is why man is the only metaphysical animal To wonder why the universe should be as it is presupposes the notion of its being different and a brute which never reduces the actual to fluidity by breaking up *its literal sequences in his imagination* can never form such a notion He takes the world simply for granted and never wonders at it at all

Professor Strumpell quotes a dog story which is probably a type of many others The feat performed looks like abstract reasoning but an acquaintance with all the circumstances shows it to have been a random trick learned by habit The story is as follows

I have two dogs a small long legged pet dog and a rather large watch dog Immediately beyond the house court is the garden into which one enters through a low lattice gate which is closed by a latch on the yard side This latch is opened by lifting it Besides this moreover the gate is fastened on the garden side by a string nailed to the gate post Here as often as one wished could the following sight be *observed If the little dog was shut in the garden and he wished to get out he* placed himself before the gate and barked Immediately the large dog in the court would hasten to him and raise the latch with his nose while the little dog on the garden side leaped up and catching the string in his teeth bit it through whereupon the big one wedged his snout between the gate and the post pushed the gate *open and the little dog slipped through Certainly reasoning seems here to prevail* In face of it however and although the dogs arrived of themselves and without human aid at their solution of the gate question I am able to point out that the complete action was pieced together out of accidental experiences which the dos followed I might say unconsciously While the large dog was young he was al*lowed like the little one to go into the garden and therefore the gate* was usually not latched but simply closed Now if he saw anyone go in he would follow by thrusting his snout between gate and post and so push the gate open When he was grown I forbade his being taken in and had the gate kept latched But he naturally still tried to follow when anyone entered and tried in the old fashion to *open it which he could no longer do Now it* fell out that once while making the attempt he raised his nose higher than usual and hit the latch from below so as to lift it off its hook and the gate unclosed From thenceforth he made the same movement of the head when trying to open it and of course with the same result He now knew how to open the gate when it was latched

The little dog had been the large one s teacher in many things especially in the chasing of cats and the catching of mice and moles so when the little one was heard barking eagerly the other always hastened to him *If the barking came from the garden he opened the gate to get inside But meanwhile the little dog* who wanted to get out the moment the gate opened slipped out between the big one s legs and so the appearance of his having come with the intention of letting him out arose And that it was simply an appearance tran pired from the fact that when

[1] The horse is a densely stupid animal as far as everything goes except continuous association We reckon him intelligent partly because he looks so handsome partly because he has such a wonderful faculty of continuous association and can be quickly moulded into a *mass of set habits* Had he anything of reasoning intelligence he would be a less faithful slave than he is

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In o cer to — which, tiually drawn, held the rate firm against the po — raised the la ch and let go it would every time fall back on to the hook. And this dev was succesful fo quite a time until it happened o e day that on my re urn fr m a walk upon which the little d g had acc mpanied me I crossed the gar en, and in pa... through the ga e the dog remained behind, and refused to come to m whistle. As t was beginning to rain, and I knew h w he disliked to get wet, I closed the gate in order t punish him in this manner But I had hardl reached the house ere he was before the gate whining and crying most piteously for the rain was falling faster and fa r The b d to whom the rain was a matter of perfect in difference was in... o hand and tried his utmost to open the gate, b t naturally with es Almost in despair the litt d b t at the gate, at the same time springing in th air in the at empt to jump o er t when he chanced to catch the ... n his teeth it broke, and the gat fl w pen. Now he knew the secret and ... thenc f rth bit the string whenever h wished to get out so that I was obliged to change t.

That th b dog in raising th latch did not in the least *know* that the latch clo ed the gat that the rai m of th same opened t but that he merely repeated the utomati blow with his sn ut which had once had such happy consequences tran spires f m the following the gate leading to the barn is fastened with a latch pre ... Like th o e n the ga den-ga only pl ced a li tle hi ...er till easily within the do s re ch. Here, too occasionall the little dog is con... ed, and when h barks the b... on makes e ery pos b e effort to open th gate but t has never occurred to him to push the latch up The brute cannot draw c clusi ns that is, he cannot think.

Othe classical d e c tue of man bes des that of bein the only reasonin an imal also seem consequences of his unri alled powers of s milar association He has e been called the laughing animal But humor has often been defined th ... tion of ident ties in things different. When the man in *Corio...nus*

—

nal distinction between man and brute But it may readily be shown how this distinction merely flows f om those we have pointed out easy dissociation of a rep esentatio into ts ingredients and association by similarity

Langua e is a system of *s gns* different from the things signified but able to suggest them.

Th Schumann *J urnal Daheim* N 9, 18 8 Q ted by Strumpell *D G ist kr f der Mensch glichen mit jenen der Thier* (Leipzi 8 8) p 39 Cats are n us f th kill with which they will pen latches, locks, tc. T ir feats are usually ascribed to their reasoning powers. B t D F manes well remarks (*A ... E ... utio* etc., p 35 not) that w ought first t be ure that th ctions are not d t mere associa n. A cat is a stantly playing with things with her paws trick accidentally hit pon may be retained. R manes tes th fact that th animals most skilled in this w y need t be the m t generally intelligent, b t th se which have th best corporeal members f handin things, cat paws, h rse lips, elephant trunk, cow h rns. The monkey has both the rpo eal and th intellectual superiority And my deprecat ry remarks animal easoning in the text p y ... less to the quadrumana than to the quadrupeds.—On the possi ... allacies in interpreting ... minds compa C. L. ... in *Mind* xi, p 74 (886)

No doubt brutes have a number of such signs When a dog yelps in front of a door and his master understanding his desire opens it the dog may after a certain number of repetitions get to repeat in cold blood a yelp which was at first the involuntary interjectional expression of strong emotion The same do may be taught to beg for food and afterwards come to do so deliberately when hungry The dog also learns to understand the signs of men and the word rat uttered to a terrier suggests exciting thoughts of the rat hunt If the do had the varied impulse to vocal utterance which some other animals have he would probably repeat the word rat whenever he spontaneously happened to think of a rat hunt—he no doubt does have it as an auditory image just as a parrot calls out different words spontaneously from its repertory and havin learned the name of a given dog will utter it on the sight of a different do In each of these separate cases the particular sign *may* be consciously noticed by the animal as distinct from the particular thing signified and will thus so far as it goes be a true manifestation of language But when we come to man we find a great difference *He has a deliberate intention to apply a sign to everything* The linguistic impulse is with him generalized and systematic For things hith erto unnoticed or unfelt he *desires* a sign before he has one Even though the dog should possess his yelp for this thing his beg for that and his auditory image rat for a third thing the matter with him rests there If a fourth thing interests him for which no sign happens already to have been learned he re mains tranquilly without it and goes no further But the man *postulates* it its absence irritates him and he ends by inventing it *This* GENERAL PURPOSE *con stitutes I take it the peculiarity of human speech and explains its prodigious development*

How then does the general purpose arise? It arises as soon as the notion of a *sign as such* apart from any particular import is born and this notion is born by dissociation from the outstanding portions of a number of concrete cases of signification The yelp the beg the rat differ as to their several imports and natures They agree only in so far as they have the same *use*—to *be signs* to stand for something more important than themselves The dog whom this similarity could strike would have grasped the sign *per se* as such and would probably thereupon become a general sign maker or speaker in the human sense But how can the similarity strike him? Not without the juxtaposition of the similars (in virtue of the law we have laid down [p 330] that in order to be segregated an experience must be repeated with varying concomitants)—not unless the yelp of the dog at the moment it occurs *recalls* to him his beg by the delicate bond of their subtle similarity of use—not till then can this thought flash through his mind *Why yelp and beg in spite of all their unlikeness are yet alike in this that they are actions signs which lead to important boons Other boons any boons may then be got by other signs!* This reflection made the gulf is passed Animals probably never make it because the bond of simi larity is not delicate enough Each sign is drowned in its import and never awakens other signs and other imports in juxtaposition The rat hunt idea is too absorbingly interesting in itself to be interrupted by anything so uncontiguous to it as the idea of the beg for food or of the door open yelp nor in their turn do these awaken the rat hunt idea

In the human child however these ruptures of contiguous association are

self No one can he
be is constituted
result

The exceedingly intere_ting account which Dr Howe gives of the education of his various blinc ... ıı trates this point admirably He began to teach Laura Bridgı
The child was tau
ular art cles when maᴅe to ı
particular signs out of the mass of which the general purpose of *signification* had not yet been extracted by the child s mind Dr Howe compares his situation at this moment to that of one lowering a line to the bottom of the deep sea in which Laura s soul lay and waiting until she should spontaneously take hold of it and be raised into the light The moment came accompanied by a radiant flash of intell gence and glow of joy' she seemed suddenly to become aware of the general purpose imbedded in the different details of all these s gns and from that moment her educat on went on with extreme rapidity

Another of the great capacit es in which man has been said to differ fundamentally from the an mal is that of possessing self-consciousness or reflective knowledge of himself as a th nker But this capacity also flows from our criter on for (without go n nto the matter very deeply) we may say that the brute never reflects on himself as a thinker because he has never clearly dissociated in the full concrete act of thought the element of the thin thou ht of and the operation by which he thinks it They remain always fused conglomerated—just as the inte j ct onal vocal s gn of the brute almost in ariably merges in his mind with the thing signified and is not independently attended to *n se*

Th ar t th ditu ns l langu g in th h m bei g dditi al t ass ciati by similarity th t assist ts cu rath p th w y f t These re fir t, th great t ral l q city and se d th g eat imitati ess f man Th first p od ce th nga nal refl int j ti nal sign th se d (as Bleek has w ll h n) fixes t tamps t, and ends by multiplyin th mbe f d termin t specifi gns which ar quısit p limi nary t th g ral n ci p rp se f gn making wh ch I h called th ch ct ristic h ma l m t in langu g Th w y in whi h mitati eness fix th m m g f signs is thus Wh primeval ma has giv m ti h tters his natural inte jecti when (I oid pposing that th reflex ds re ex eedingly d t minat by t) gr p f ch m pen mm m u n, and takes th lead in th cry th th rs cry lik him f m sympathy imit ti ess w l t f th g p hear an th wh is in prese f th experien tt th cry h with t th experience will peat th cry f m pu mitati ess B t as h pe ts the sign h will be reminded by t f his f me experie ce Thus, first, h has the sign th th em ti then with t it then, th t again It is dissociat d by chang f onc mitants h feels it as separ te entity d t as h ing nnecti with th m ti Immediat ly t bec mes p ssibl f him t uple t deliberat ly w th th em ti case wh th l tter w uld eith h p o-ked inte jectional cry t th sam In w rd his m tal proced t ds t

the charact ristics of higher h man easoning) p es ppose consciousness f deas as ch,

Now the dissociation of these two elements probably occurs first in the child s mind on the occasion of some error or false expectation which would make him experience the shock of difference between merely imagining a thin and getting it The thought experienced once with the concomitant reality and then without it or with opposite concomitants reminds the child of other cases in which the same provoking phenomenon occurred Thus the general ingredi ent of error may be dissociated and noticed *per se* and from the notion of his error or wrong thought to that of his thought in general the transition is easy The brute no doubt has plenty of instances of error and disappointment in his life but the similar shock is in him most likely always swallowed up in the acci dents of the actual case An expectation disappointed may breed dubiety as to the realization of that particular thing when the dog next expects it But that disappointment that dubiety while they are present in the mind will *not* call up other cases in which the material details were different but this feature of possible error was the same The brute will therefore stop short of dissociating the general notion of error *per se* and *a fortiori* will never attain the conception of Thought itself as such

We may then we think consider it proven that *the most elementary single difference between the human mind and that of brutes lies in this deficiency on the brute s part to associate ideas by similarity*—characters the abstraction of which depends on this sort of association must in the brute always remain drowned swamped in the total phenomenon which they help constitute and never used to reason from If a character stands out alone it is always some ob vious sensible quality like a sound or a smell which is instinctively exciting and lies in the line of the animal s propensities or it is some obvious sign which ex perience has habitually coupled with a consequence such as for the dog the sight of his master s hat on and the master s going out

Different Orders of Human Genius

But now since nature never makes a jump it is evident that we should find the lowest men occupying in this respect an intermediate position between the brutes and the highest men And so we do Beyond the analogies which their own minds suggest by breaking up the literal sequence of their experience there is a whole world of analogies which they can appreciate when imparted to them by their betters but which they could never excogitate alone This answers the question why Darwin and Newton had to be waited for so long The flash of similarity between an apple and the moon between the rivalry for food in na ture and the rivalry for man s selection was too recondite to have occurred to any but exceptional minds *Genius then* as has been already said *is identical with the possession of similar association to an extreme degree* Professor Bain says This I count the leading fact of genius I consider it quite impossible to afford any explanation of intellectual originality except on the supposition of

as th ngs dist nct f om the obj cts and that thi n ou n d p nd n u having made signs for them by languag My text s m to m t nclud D R man f ts nd formulates them in what to me s a m r elem ntary w y th ugh th reade who wishes to under tand the matte b tt hould g to his f a nd pat nt xpo t on als

unusual energy on this point Alike in the arts in literature in practical affairs and in science association by similarity is the prime condition of success

But as according to our view there are two sta es in reasoned thought one where similarity merely *operates* to call up cognate thoughts and another far ther stage where the bond of identity between the cognate thoughts is *noticed* so *minds of genius may be divided into two ma n sorts those who notice the bond nd those who merely obey t* The first are the abstract reasoners prop-erly so called the men of science and philosophers—the analysts in a word the latter are the poets the critics—the artists in a word the men of intuitions These judge ri htly classify cases characterize them by the most striking ana logic epithets but go no further At first si ht it mi ht seem that the analytic mind represented simply a higher intellectual sta e and that the intuitive mind represented an arrested stage of intellectual development but the difference is not so simple as this Professor Bain has said that a man s advance to the scien tific stage (the stage of noticing and abstracting the bond of similarity) may often be due to an *absence* of certain emotional sensibilities The sense of color he says may no less determ ne a mind away from science than it determines it toward painting There must be a penury in one s interest in the details of par ticular forms in order to permit the forces of the intellect to be concentrated on what is common to many forms In other words supposing a mind fertile in the suggestion of analog es but at the same time keenly interested in the particu lars of each suggested image that mind would be far less apt to sin le out the particular character which called up the analogy than one whose interests were less generally lively A certain richness of the æsthetic nature may therefore easily keep o e in the intuitive stage All the poets are examples of this Take Homer

> Ulysses too sp ed round the house t see f any man w e till al e and hidin trying t get y f m gl my death. He found them all fall n in th blood and dirt and in s ch n mber s the fish which the fi hermen to the low shor o t of the foaming ea dra w th their meshy ets These all si k fo the ocean w ter are strewn ound th sands while th blazing sun takes their life f m them. So there the uitors l y t ewn ound o one another
>
> o
>
> — a
>
> — — —m n wise were thy stout thighs Menelaos and l gs and fair ankles stained w th blood.

A man in whom all the accidents of an analogy rise up as vividly as this may be excused for not attending to the ground of the analogy But he need not on that accou t be deemed intellectually the inferior of a man of drier mind in whom the ground is not as liable to be eclipsed by the general splendor Rarely are both sorts of int llect the splendid and the analytic found in conjunction. Plato amon philosophers and M Taine who cannot quote a child s saying without describing the *voix ch ntante et on ée heu euse* in which it is ut tered are only except ons whose strangeness proves the rule

An often-quoted wr ter has said that Shakespeare possessed more *ntellectual*

[1] *St dy f Character* p 3 7

[2] T anslated by my lleagu Professo G H. Palmer

power than any one else that ever lived If by this he meant the power to pass from given premises to right or congruous conclusions it is no doubt true The abrupt transitions in Shakespeare s thought astonish the r d their unex pectedness no less than they delight tance does the death of a sense of reconcilement ould very likely *not say why* for his in vention thoug rational was not ratiocinative Wishing the curtain to fall upon a reinstated Othello that speech about the turbaned Turk suddenly sim ly flashed across him as the right end of all that comes after can ho

What better *or an instant* ident days and then exe o smite all enemies of hose mind supplied these means could probably have told why they were so effective

But though this is true and though it would he o *say that a given an*

ac If n thing he may prove the same in which you notoriously do as he now pro and this with no ability to state the *point* in which the cases are similar *In all primitive literature in all savage oratory we find persuasion carried on* exclusively by parables and similes and travellers in savage countries readily adopt the native custom Take for example Dr Livingstone s argument with the negro conjurer The missionary was trying to dissuade the savage from his fetichistic ways of invoking rain You see said he that after all your oper ations sometimes it rains and sometimes it does not exactly as when you have not operated at all B *he sorcerer it is just the same with you* ometimes the patient gets well and some ing at all To that the pious missionary ne doctor does his duty after which God performs the cure if it pleases Him Well rejoined the savage it is just so with me I do what is necessary to procure rain after which God sends it or withholds it according to His pleasure [1]

This is the stage in which proverbial philosophy reigns supreme An empty sack can t stand straight will stand for the reason why a man with debts may lose his honesty and a bird in the hand is worth two in the bush will serve to back up one s exhortations to prudence Or we answer the question Why is snow white? by saying *For the same reason that soap suds or whipped eggs are white —in other words instead of giving the reason for a fact we give an* other *example* of the same fact This offering of a similar instance instead of a reason has often been criticised as one of the forms of logical depravity in men

[1] Quoted by Renouvier in *C t que ph losophique* October 19 1879

But manifestly it is not a perverse act of thought but only an incomplete one Furnishing parallel cases is the necessary first step towards abstracting the reason imbedded in them all

As it is with reasons so it is with words The first words are probably always names of entire things and entire actions of extensive coherent groups A new experience in the primitive man can only be talked about by him in terms of the old experiences which have rece a mes It reminds him of certain ones from amon them but the *points* in v dissociated Pure similarity mu based upon it The first adject bodying the strikin character hard but the bread is sto moon not the fruit is swee are thus neither particular nor general but *vaguely* concrete just as we speak of an oval face a velvet skin or an iron will without meaning to connote any other attributes of the adjective-noun than those in which it *does* resemble the noun it is used to qualify After a while certain of these adjectively used nouns come only to signify the particular quality for whose sake they are often est used the *entire th ng* which they originally meant rece ves another name, and they become true abstract and general terms Oval for example with us suggests *only* shape The first abstract qualities thus formed are no doubt qualities of one and the same sense found in different objects—as big sweet next a h ween different senses as sharp of taste high of sound etc.
t
(

Over immense departments of our thought we are still all of us in the savage state Similarity operates in us but abstraction has not taken place We know what the present case is like we know what it reminds us of we ha e an intuition of the right course to take if it be a practical matter But analytic thought has made no tracks and we cannot justify oursel es to others In ethical psy

Irish girl why she likes this country better or worse than her home and see how much she can tell you But if you ask your most educated friend why he prefers T tian to Paul Veronese you will hardly get mo e of a reply and you will probably get absolutely none if you inquire why Beethoven reminds him of Michel angelo or how it comes that a bare figure with unduly flexed joints by the latter can so suggest the moral tragedy of l fe His thought obeys a *exus* but cannot name t And so it is with all those judgments of *experts* which even though unmoti ed are so valuable Saturated with experience of a particular class of materials, an expert intuiti ely feels whether a newly reported fact is probable or t whether a proposed hypothesis is worthless or the reverse He instinct vely knows that in a novel case this and not that will be the promising course

of action The well l nown story of the old judge advising the new one never to give reasons for his decisions — the decisions will probably be right, the reasons

tor will feel that the patient is

at the tooth will break, though

The reason lies imbedded but not yet laid bare in all the countless previous cases dimly suggested by the actual one all calling up the same conclusion which the adept thus finds himself swept on to he knows not how or why

A physiological conclusion remains to be drawn If the principles laid down in Chapter XIV are true then it follows that the great cerebral difference between habitual and reasoned thinking must be this that in the former an entire system of cells vibrating at any one moment discharges in its totality into another entire system and that the order of the discharges tends to be a constant one in time whilst in the latter a part of the prior system still keeps vibrating in the mid[illegible] [illegible]stem and the order—which part this shall be and wh[illegible]

fixe[illegible]

sistently w[illegible]

to be the basis of similar association (See especially pp 378–80) It would seem to be but a minor degree of that still more urgent and importunate localized vibration which we can easiest conceive to underlie the mental fact of interest attention or dissociation In terms of the brain process then all these mental facts resolve themselves into a single peculiarity that of indeterminateness of connection between the different tracts and tendency of action to focalize itself so to speak in small localities which vary infinitely at different times and from which i[illegible]

figure 80 p 678

physiology) to adumbrate by some possible guess on what chemical or [illegible]lar mechanical fact this instable equilibrium of the human brain may depend should be the next task of the physiologist who ponders over the passage *from brute to man* Whatever the physical peculiarity in question may be it is the cause why a man whose brain has it reasons so much whilst his horse whose brain lacks it reasons so little We can but bequeath the problem to abler hands than our own

But meanwhile this mode of stating the matter suggests a couple of other inferences The first is brief If *focalization* of brain activity be the fundamental fact of reasonable thought we see why intense interest or concentrated passion makes us think so much more truly and profoundly The persistent *focalization* of motion in certain tracts is the cerebral fact corresponding to the persistent domination in consciousness of the important feature of the subject When not focalized we are scatter brained but when thoroughly impassioned we never wander from the point None but congruous and relevant images arise When roused by indignation or moral enthusiasm how trenchant are our reflections how smiting are our words! The whole network of petty scruples and by considerations which at ordinary languid times surrounded the matter like a cobweb holding back our thought as Gulliver was pinned to the earth by the myriad Lilliputian threads are dashed through at a blow and the subject stands with its essential and vital lines revealed

The last point is relative to the theory that what was acquired habit in the an cestor may become congenital tendency in the off pring So vast a superstruc ture is raised upon this principle that the paucity of empirical evidence for it has alike been matter of regret to its adherents and of triumph to its opponents In Chapter xxviii we shall see what we may call the whole beggarly array of proof In the human race where our opportunities for observation are the most complete we seem to have no evidence whatever which would support the hy pothesis unless it possibly be the law that city bred children are more apt to be near sighted than country children In the mental world we certainly do not observe that the children of great travellers get their geography lessons with un usual ease or that a baby whose ancestors have spoken German for thirty gen erations will on that account learn Italian any the less easily from its Italian nurse But if the cons derations we have been led to are true they explain per fectly well why this law *should not* be verified in the human race and why therefore in looking for evidence on the subject we should confine ourselves exclusively to lower animals In them fixed habit is the essential and characteris tic law of nervous action The brain grows to the exact modes in which it has been exercised and the inheritance of these modes—then called instincts—would have in it nothing surpr ing But in man the negation of all fixed modes is the essential characteristic. He owes his whole pre-eminence as a reasoner his whole human quality of intellect we may say to the facility with which a given mode of thou ht in him may suddenly be broken up into elements which re combine anew Only at the price of inheriting no settled instinctive tendencies is he able to settle every novel case by the fresh discovery by his reason of novel principles. He is, *par excellence* the ed cable animal If then the law that hab ts are inherited were found exemplified in him he would in so far forth fall sho t of his human perfections and when we survey the human races we actu ally do find that those which are most instinctive at the outset are those which on the whole are least educated in the end. An untutored Italian is to a great extent, a man of the world he has instinctive perceptions tendencies to behav ior reactions in a word upon his environment which the untutored German wholly lacks. If the latter be not drilled he is apt to be a thoroughly loutish per sona e but on the other hand the mere absence in his brain of definite innate tendencies enables him to advance by the development through education of his purely reasoned thinkin into complex regions of consciousness that the Italian may probably never approach

We observe an identical difference between men as a whole and women as a whole A young woman of twenty reacts with intuitive promptitude and se curity in all the usual circumstances in which she may be placed Her likes and dislikes are formed he opinions to a great extent the same that they will be through life Her character is in fact finished in its essentials How inferior to

boys each themsel es how clock goes few girls. Hence Dr Whately' jest, "W man is the unreasoning animal, and pokes the fire from top.

her is a boy of twenty in all these respects! His character is still gelatinous uncertain what shape to assume trying it on in every direction Feeling his power yet ignorant of the manner in which he shall express it, he is when compared with his sister a being of no definite contour But this absence of prompt tendency in his brain to set into particular modes is the very condition which insures that it shall ultimately become so much more efficient than the woman s. The very lack of preappointed trains of thought is the ground on which general principles and heads of classification grow up and the masculine brain deals with new and complex matter indirectly by *means of these in a manner* which the feminine method of direct intuition admirably and rapidly as it performs within its limits, can vainly hope to cope with

*In looking back over the subject of reasoning one feels how intimately con*nected it is with conception and one realizes more than ever the deep reach of that principle of selection on which so much stress was laid towards the close of Chapter IX As the art of reading (after a certain stage in one s education) is the art of skipping so the art of being wise is the art of knowing what to overlook The first effect on the mind of *growing cultivated is that processes* once multiple get to be performed by a single act Lazarus has called this the progressive condensation of thought But in the psychological sense it is less a condensation than a loss a genuine dropping out and throwing overboard of conscious content Steps really sink from sight An advanced thinker sees the relations of his topics in such masses and so instantaneously that when he comes to explain to younger minds it is often hard to say which grows the more perplexed he or the pupil In every university there are admirable investigators who are notoriously bad lecturers The reason is that they never spontaneously see the subject in the minute articulate way in which the student needs to have it offered to his slow reception They grope for the links but the links do not come Bowditch who translated and annotated Laplace s *Mécanique céleste* said that whenever his author prefaced a proposition by the words it is evident he knew that many hours of hard study lay before him

When two minds of a high order interested in kindred subjects come together their conversation is chiefly remarkable for the summariness of its allusions and the rapidity of its transitions *Before one of them is half through a* sentence the other knows his meaning and replies Such genial play with such massive materials such an easy flashing of light over far perspectives such careless indifference to the dust and apparatus that ordinarily surround the subject and seem to pertain to its essence make these conversations seem true feasts for gods to a listener who is educated enough to follow them at all His mental lungs breathe more deeply in an atmosphere more broad and vast than is their wont On the other hand the excessive explicitness and short windedness of an ordinary man are as wonderful as they are tedious to the man of genius But we need not go as far as the ways of genius Ordinary social intercourse will do There the charm of conversation is in direct proportion to the possibility of abridgment and elision and in inverse ratio to the need of explicit *statement* With old friends a word stands for a whole story or set of opinions With new comers everything must be gone over in detail Some persons have a real mania for completeness they must express every step They are the most intolerable of

companions and although their mental energy may in its way be great they always strike us as weak and second rate In short the essence of plebeianism that which separates vulgarity from aristocracy is perhaps less a defect than an excess the constant need to animadvert upon matters which for the aristocratic temperament do not exist. To ignore to disdain to consider to overlook are the essence of the gentleman Often most pr
may be of the deepest moral consequence
tion with the gentleman we have a consc
and negativeness in the actual emergency is somehow or
general superiority to ourselves It is not only that the gentleman ignores considerations relative to conduct sordid suspicions fears calculations etc. which the vulgarian is fated to entertain it is that he is silent where the vulgarian talks that he gives nothing but results where the vulgarian is profuse of reasons that he does no   that he uses one sentence instead of twenty and that ir
call t which it is qu
that the vulgarian mind per
leaves the field *clear*—fo h gher fl hts should they choose to come But even if they never came what thoughts the e were would till manifest the aristocratic type and wear the well bred form So great is our sense of harmony and ease in passing from the company of a philistine to that of an aristocratic temperament that we are almost tempted to deem the falsest views and tastes as held by a man of the wo ld truer than the truest as held by a common person In the latter the best ideas are choked obstructed and contaminated by the redundancy of their paltry associates The negative conditions at least of an atmosphere and a free outlook are present in the former

I may appear to have strayed from psychological analysis into æsthetic criticism. But the principle of selection is so important that no illustrations seem redundant which may help to show how great is its scope The upshot of what I sa simply is that selection implies rejection as well as choice and that the function of ignorin of inattention is as vital a factor in mental progress as the function of attention itself

Chapter XXIII

THE PRODUCTION OF MOVEMENT

THE reader will not have forgotten, in the jungle of purely inward processes and products through which the last chapters have borne him, that the final result of them all must be some form of bodily activity due to the escape of the central excitement through outgoing nerves The whole neural organism, it will be remembered is physiologically considered, but a machine for converting stimuli into reactions and the intellectual part of our life is knit up with but the middle or central portion of the machine s operations Let us now turn to consider the final or emergent operations the bodily activities and the forms of consciousness connected therewithal

Every impression which impinges on the incoming nerves produces some discharge down the outgoing ones whether we be aware of it or not Using sweeping terms and ignoring exceptions *we might say that every possible feeling produces a movement and that the movement is a movement of the entire organism and of each and all its parts* What happens patently when an explosion or a flash of lightning startles us or when we are tickled happens latently with every sensation which we receive The only reason why we do not feel the startle or tickle in the case of insignificant sensations is partly its very small amount partly our obtuseness Professor Bain many years ago gave the name of the Law of Diffusion to this phenomenon of general discharge and expressed it thus

According as an impression is accompanied with Feeling the aroused currents diffuse themselves over the brain leading to a general agitation of the moving organs as well as affecting the viscera

In cases where the feeling is strong the law is too familiar to require proof As Prof Bain says

> Each of us knows in our own experience that a sudden shock of feeling is accompanied with movements of the body generally and with other effects When no emotion is present we are quiescent a slight feeling is accompanied with slight manifestations a more intense shock has a more intense outburst Every pleasure and every pain and every mode of emotion has a definite wave of effects which our observation makes known to us and we apply the knowledge to infer other men s feelings from their outward display The organs first and prominently affected in the diffused wave of nervous influence are the moving members and of these by preference the features of the face (with the ears in animals) whose movements constitute the *expression* of the countenance *But the influence extends to all parts of the* moving system voluntary and involuntary while an important series of effects are produced on the glands and viscera—the stomach lungs heart kidneys skin together with the sexual and mammary organs The circumstance is seemingly universal the proof of it does not require a citation of instances in detail on the objectors is thrown the burden of adducing unequivocal exceptions to the law [1]

There are probably no exceptions to the diffusion of every impression through the *nerve centres* The *effect* of the wave through the centres may however of

[1] *The Emotions and the Will* pp. 4 5.

ten be to interfere with processes and to diminish tensions already existing there and the outward consequences of such inhibitions may be the arrest of discharges from the inhibited regions and the checkin, of bodily activities al ready in process of occurrence When this happens it probably is like the drain in or siphoning of certain channels by currents flowing throu,h others When in walkin we suddenly stand still because a sound si ht smell or thought catches our attention something like this occurs But there are cases of arrest of per pheral activity which depend not on central inhibition but on stimula tion of centres which dischar,e outgoing currents of an inhibitory sort When ever we are startled for example our heart momentarily stops or slows its beat in and then palpitates with accelerated peed The brief arrest is due to an out going current down the pneumogastric nerve This nerve when stimulated stops or slows the heart beats and this particular effect of startling fails to oc cur if the nerve be cut

In general however the stimulating effects of a sense impression preponder ate over the inhibitin effects so that we may roughly say as we began by say ing that the wa e of dischar e produces an activity in all parts of the body The task of tracin out *all* the effects of any one incoming sensation has not yet been p D t ears have however be un to enlarge our in tails prove the truth of the law of diffusion

First take *effects upon the ci culat on* Those upon the heart we have just seen Haller long a o recorded that the blood from an open vein flowed out faster at the beat of a drum In Chapter III (p 64) we learned how instantaneously acco ding to Mosso the circulation in the brain is altered by changes of sensation and of the course of thou ht The effect of objects of fear shame and an er upon the blood supply of the skin e,pecially the skin of the face are too

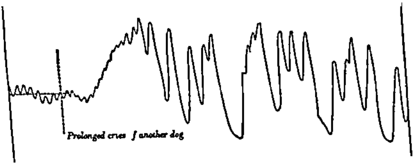


FIG. 8

well known to need remark Sensat ons of the higher senses produce according to Couty and Charpentier the most var ed effects upon the pulse-rate and blood pressure in dogs Fig 81 a pulse-tracing from these authors shows the tumultuous effect on a dog s heart of hearin the screams of another dog The changes of blood pressure still occurred when the pneumo,astric nerves were

Cf F t S ton t M m t (887) p 56

cut showing the vaso motor effect to be direct and not dependent on the heart. When Mosso invented that simple instrument the *plethysmograph* for record ing the fluctuations in volume of the members of the body what astonished him



FIG 82

he says in the first experiments [which he] made in Italy, was the extreme unrest of the blood vessels of the hand which at every smallest emotion wheth er during waking or during sleep changed their volume in surprising fashion [1] Figure 82 (from Féré[2]) shows the way in which the pulse of one subject was modified by the exhibition of a red light lasting from the moment marked *a* to that marked *b*

The effects upon respiration of sudden sensory stimuli are also too well known to need elaborate comment We catch our breath at every sudden sound We hold our breath ' whenever our attention and expectation are strongly engaged and we sigh when the tension of the situation is relieved When a fearful object is before us we pant and cannot deeply inspire when the object makes us angry it is, on the contrary the act of expiration which is hard I subjoin a couple of figures from Fere which explain themselves They show the effects of light upon the breathing of two of his hysteric patients [3]

On the sweat glands similar consequences of sensorial stimuli are observed Tarchanoff testing the condition of the sweat glands by the power of the skin to start a galvanic current through electrodes applied to its sur face, found that nearly every kind of nervous activity from the simplest sensations and impressions to volun tary motions and the highest forms of mental exertion is accompanied by an increased activity in the glands of the skin [4] *On the pupil* observations are recorded by Sanders which show that a transitory dilatation follows every sensorial stimulus applied *during sleep* even if the stimulus be not strong enough to wake the subject up At the moment of awaking there is a dilatation even if strong light falls on the eye[5] The pupil of children can easily be observed to dilate enormously under the influence of *fear* It is said to dilate in pain and fatigue and to contract on the contrary in rage



FIG 83 Resp ratory curve of B *a* with eyes open *b* with eyes closed

[1] *La Paura* (1884) p 117 *Cf* Féré *Sensation et mouveme t* chap XVII.
[2] *Rev e philosoph que* XXIV p 570
[3] *Revue ph l* XXIV pp 566-67—For further information about the relations between the brain and resp ration see Danilewsky s essay in the *B ologisches Ce t alblatt* II p 690
[4] Quoted from the report of Tarchanoff s paper (n *Pfluger's Arch v* XLVI p 46) in the *American Jour l of Psych* II p 652
[5] *Arch v f Psychiatr e* VII p 652 IX p 129

As regards *effects on the abdominal viscera* they unquestionably exist but very few accurate observations have been made.

The bladder bowel and uterus respond to sensations even indifferent ones. Mosso and Pellicani in their plethysmographic investigations on the bladder of dogs, found all sorts of sensorial stimuli to produce reflex contractions of this organ, independent of those of the abdominal walls. They call the bladder as good an æsthesiometer as the iris, and refer to the not uncommon reflex effects of psychic stimuli in the human female upon this organ M Fere has registered the contractions of the sphincter ani which even indifferent sensations will produce In some pregnant women the fœtus is felt to move after almost every sensorial excitement received by the mother The only natural explanation is that it is stimulated at such moments by reflex contractions [illegible] womb That the glands are affected in emotion [illegible]



Fig. 84. Respiratory curves (L 4, with yellow light b with green light, with red light. The red has the strongest effect.

The watering of the mouth at the sight of succulent food is well known It is difficult to follow the smaller degrees of all these reflex changes but it can hardly be doubted that they exist in some degree even where they cease to be traceable and that all our sensations have some visceral effects The sneezing produced by sunshine the roughening of the skin (gooseflesh) which certain strokings contacts and sounds, musical or non-musical, provoke are facts of the same order as the shuddering and standing up of the hair in fear only of less degree.

Effects on Voluntary Muscles Every sensorial stimulus not only sends a special discharge into certain particular muscles dependent on the special nature of the stimulus in question—some of these special discharges we have studied in Chapter XI others we shall examine under the heads of Instinct and Emotion—but it innervates the muscles generally M Fere has given very curious experimental proofs of this The strength of contraction of the subject s hand was measured by a self registering dynamometer Ordinarily the maximum strength under simple experimental conditions remains the same from day to day But if simultaneously with the contraction the subject received a sensorial impression the contraction was sometimes weakened but more often increased This reinforcing effect has received the name of *dynamogeny* The dynamogenic value of simple *musical notes* seems to be proportional to their loudness and height. Where the notes are compounded into sad strains, the muscular strength diminishes. If the strains are gay it is increased —The dynamogenic value of *colored lights* varies with

Sensation et mouvement pp. 57 58.

R Acad dei Lincei (1883-8) I follow the report in Hofmann u. Schwalbe Jahresbericht x, ii, p 93 Cf Fere Sensation et mouvement chap XIV

the color In a subject[1] whose normal strength was expressed by 24 when a blue light was th o n ... ecame 35 for ... sweet

le remarks such a sour as acetic acid excites the nerves of pain and smell as well as of taste The stimulating effects of tobacco smoke alcohol beef extract

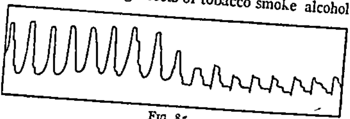


Fig 85

(which is innutritious) etc etc may be partly due to a dynamogenic action of this sort —Of *odors* that of musk seems to have a peculiar dynamo enic power Fig 85 is a copy of one of M Féré s dynamographic tracings which explains itself The smaller con ... timulus the stronger

... upwards of the foot ... er knee Drs Weir Mitchell ... le knee-pan when the when other sensations come in simultaneously with the tap the jerk is increased[2] Heat cold pricking itching, or faradic stimulation of the skin sometimes strong optical impressions music all have this dynamogenic effect which also results whenever voluntary movements are set up in other parts of the body simultaneously with the tap[3]

These dynamogenic effects in which one stimulation simply reinforces another already under way must not be confounded with reflex acts properly so called in which new activities are originated by the stimulus All ... performances and manife t ...

cular *tone* but which in certain neurotic subjects can be demonstrated ocularly ... ons might be called fluctuations of mus- M Fere figures some of them in the article to which I have already referred[4]

Looking back over all these facts it is hard to doubt the truth of the law of

[1] T ... ct and the differences are greater th n ... s system of the hyst ric (*ces gre ouilles* ... gerated scale without altering the ... nfluence of sensations upon mini ... and reported on page 470 of this

[2] Mitchell in (Philadelphia) *Medical News* (Feb 13 and 20 1886) Lombard in *American Jou nal of Psychology* (Oct 1887)

[3] Prof H P Bowditch has made the interesting discovery that if the reinforcing movement be as much as 0.4 of a second late th reinforcement fails to occur and is transformed into a positive inhib tion of the knee j rk for retardati ns of between 0.4 and 1 7 The knee jerk fails to be modified at all by voluntary movem nts made later than 1 7 after the pat llar ligament is tapped (see *Boston Med and S rg Jour al* May 31 1888)

[4] *Revue phil* XXIV p 572 ff

(
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again to the assimilation which was exp...

central mass to a good conductor charged with electricity of which the tension cannot be chan ed anywhere without changing it everywhere.

Herr Schneider has tried to show by an in enious and suggestive zoological review that all the *special* movements which highly evolved animals make are differentiated from the two originally simple movements of contraction and expansion in which the entire body of simple organisms takes part. The tendency to contract is the source of all th ... e impulses and reactions which are later de eloped including th
on the contrary into the impuls
fighting sexual intercourse etc. ...
only for the careful observations on animals which they embody I cite them here as a sort of evolutionary reason to add to the mechanical *a priori* reason why there *ought* to be the diffusive wave which our *a posteriori* instances have shown to exist.

I will now proceed to a detailed study of the more important classes of movement consequent upon cerebro-mental change They may be enumerated as—

1 Instinctive or Impulsive Performances
2 Expressions of Emotion and
3 Voluntary Deeds

and each shall have a chapter to itself

In th *Vierteljahr chrift fur wiss Phil* III, p. 294.

Chapter XXIV

INSTINCT

INSTINCT *is usually defined as the faculty of acting in such a way as to produce certain ends without foresight of the ends and without previous education in the performance* That instincts as thus defined exist on an enormous scale in the animal kingdom needs no proof They are the functional correlatives of structure With the presence of a certain organ goes one may say almost always a native aptitude for its use

Has the bird a gland for the secretion of oil? She knows instinctively how to press the oil from the gland and apply it to the feather Has the rattlesnake the grooved tooth and gland of poison? He knows without instruction how to make both structure and function most effective against his enemies Has the silk worm the function of secreting the fluid silk? At the proper time she winds the cocoon such as she has never seen as thousands before have done and thus without instruction pattern or experience forms a safe abode for herself in the period of transformation Has the hawk talons? She knows by instinct how to wield them effectively against the helpless quarry [1]

A very common way of talking about these admirably definite tendencies to act is by naming abstractly the purpose they subserve such as self preservation or defence or care for eggs and young—and saying the animal has an instinctive fear of death or love of life or that she has an instinct of self preservation or an instinct of maternity and the like But this represents the animal as obeying abstractions which not once in a million cases is it possible it can have f m d The t ct physiological way of interpreting the facts leads to far clearer

body or at a distance in his environment The cat runs after the mouse r or shows fight before the dog avoids falling from walls and trees shuns fire and water etc not because he has any notion either of life or of death or of self or of preservation He has probably attained to no one of these conceptions in such a way as to react definitely upon it He acts in each case separately and simply because he car

running thing called a

when that particular b

he *must* retire if at a distance and scratch it close by

his feet from water and his face from flame etc His nervous system is to a great extent a preorganized bundle of such reactions—they are as fatal as sneezing and as exactly correlated to their special excitants as it is to its own Although the naturalist may for his own convenience class these reactions under general heads he must not forget that in the animal it is a particular sensation

1 P A. Chadbourne *Instinct* p 28 (New Yo k 1872)

or perception or image which calls them forth

At first this view astounds us by the enormous number of special adjustments it supposes animals to possess rea — d n anticipation of the outer things among which they are to dwell C
so far? Is each thing born fitted t
sively as locks are fitted to their
be so Each nook and cranny of creation down to our very skin and entrails has its living inhabitants with organs suited to the place to devour and digest the food it harbors and to meet the dangers it conceals and the minuteness of adaptation thus shown in the way of *structure* knows no bounds Even so are there no bounds to the minuteness of adaptation *in the way of conduct* which the several inhabitants display

The older writings on instinct are ineffectual wastes of words because their authors never came down to this definite and simple point of view but smothered everything in vague wonder at the clairvoyant and prophetic power of the animals—so superior to anything in man—and at the beneficence of God in endowing them with such a gift But God s beneficence endows them first of all with a nervous system and turning our attention to this makes instinct immediately appear neither more nor less wonderful than all the other facts of life

Every inst nct is an impulse Whether we shall call such impulses as blushing sneezing coughing smiling or dodging or keeping time to music instincts or not, is a mere matter of terminology The process is the same throughout In his delightfully f esh and interesting work *Der Thierische Wille* Herr G H Schneider subdivides impulses (*Triebe*) into sensation impulses perception impulses and dea impulses To crouch from cold is a sensation impulse to turn and follow if we see people running one way is a perception impulse to cast ho for co er if it begins to blow and rain is an imagination impulse A

when on eye ear or nostril he gets an impression of its presence at a certain distance he *spr ngs* upon it either when the booty takes alarm and flees or when the distance is sufficiently reduced he proceeds to *tear* and *devour* it the moment he gets a sensation of its contact with his claws and fangs Seeking stalking pringing and devouring are just so many different kinds of muscular contraction and neither kind is called forth by the stimulus appropriate to the other

Schneider says of the hamster which stores corn in ts hole

t t lies in ts natur to feel as soon a ts che k p ches e fill d an irres stible des t hurry to ts h me and fi ally t l es in ts nature that the sight f th tore-house should waken the impulse to empty the cheeks (p o8)

Thus we may be sure that however mysterious some animals instincts may appear to us our instincts will appear no less mysterious to them And we may conclude that to the animal which obeys it every impulse and every step of every instinct shines with its own sufficient light and seems at the moment the only eternally ri ht and proper thing to do It is done for its own sake exclusively What voluptuous thrill may not shake a fly when she at last discovers the one particular leaf or carrion or bit of dung that out of all the world can stimulate her ovipositor to its discharge? Does not the discharge then seem to her the only fitting thin ? And need she care or know anything about the future maggot and its food?

Since the egg-layi g instincts are simple examples to consider a few quotations about them from Schneider may be serviceable

The phen
with mystifi
t the n um
every anim.
capable of
the eggs but all th ari us at
by th pe eptio of the p oper object and the relati n of this perception to the vari us tages of maternal impulse. When the burying beetle percei es a carrion, she is t only impelled to approach t and lodge her eggs in it, but also to g through the mo ements equisite f r b rying t just as a bird who sees his hen b d is impelled t caress her t strut around her da ce befo e her or in some other way to woo her just as tig when he sees an antel pe, is impelled to stalk t to pounce upon it, and to trangl t When th tail r bee cuts out p es of ose-leaf bends them carries them int a caterpillar o mouse hole in trees r in the earth co ers their seams gain with the p eces and so makes a thimble shaped case—when she fills this with h ey and lays an egg in t all these vari us app opriate exp essions of her will are to be explained by supposing that t the time when the eggs ar ripe within he the appearanc f a suitable cat rpillar or mouse hole and the pe eption of r se lea es are so rrelated in the ins ct with th several impulses in question that th per f rmances foll w a matter f course when the pe cepti s take place.

Th perceptio f the empty nest or of single egg seems birds to stand in such a close elati to th physiological fu ctions of o paratio that t serves as a direct stimul t these functi ns while th pe ption of suffici t number of eggs has just the opposite effect. It is well kno n that hens and ducks lay more eggs if we

f om the fact that many birds g. wild ducks teal eggs f om each othe The bodily di pos tio to sit is t is true, o c ditu n [sin e broody hens will sit where the ar eggs] but the perception of the eggs is the other co dition of the acti ity

representati ns f tility? (G. H. Schneider D Thier. k Wille p 87) *A priori*, there is reaso t ppose that y sensati might t in *me* animal cause y m ti od y impulse. T us t seems unnatural that an od sh uld directly excit anger fear colo lust. Y t th are creatures to which som mells re quit as frightful as any sounds, and ry likely th t which colo is as m ch sexual irritant as f rm.

In certain animals of a low order the feeling of having executed one impul sive step is such an indispensable part of the stimulus of the next one, that the animal cannot make any variation in the order of its performance

Now why do the various animals do what seem to us such strange things, in the presence of such outlandish stimuli? Why does the hen for example submit herself to the tedium of incubating such a fearfully uninteresting set of objects as a nestful of eggs unless she have some sort of a prophetic inkling of the result? The only answer is *ad hominem* We can only interpret the instincts of brutes by what we know of instincts in ourselves Why do men always lie down when they can on soft beds rather than on hard floors? Why do they sit round the stove on a cold day? Why in a room, do they place themselves, ninety nine times out of a hundred with their fa to d
wall?
ditch
her se ms more important and significant than anything else in the world? Nothing more can be said than that these are human ways and that every creature *likes* its own ways and takes to the following them as a matter of course Science may come and consider these ways and find that most of them are useful But it is not for the sake of their utility that they are followed, but because at the moment of following them we feel that that is the only appropri ate and natural thing to do Not one man in a billion when taking his dinner ever thinks of utility He eats because the food t t d

proof but its own evidence It takes in short what Berkeley calls a mind debauched by learning to carry the process of making the natural seem strange so far as to ask for the *why* of any instinctive human act To the meta physician alone can such questions occur as Why do we smile when pleased and not scowl? Why are we unable to tall to a crowd as we talk to a single friend? Why does a particular maiden turn our wits so upside down? The com mon man can only say *Of course* we smile *of course* our heart palpitates at the sight of the crowd *of course* we love the maiden that beautiful soul clad in that perfect form so palpably and flagrantly made from all eternity to be loved!

And so probably does each animal feel about the particular things it tends to do in presence of particular objects They too are *a priori* syntheses To the lion it is the lioness which is made to be loved to the bear the she bear To the broody hen the notion would probably seem monstrous that there should be a creature in the world to whom a nestful of eggs was not the ut terly fascinating and precious and never to-be-too much sat upon object which it is to her [1]

[1] It would be very simple minded to suppose that bees follow thei queen and protect her and care for her because they are aware that without her the hive w uld become extinct. The odor r the aspect of the r queen is manifestly agreeable to the bees—th t is why th y love her o Does not all true love base itself on ag eeable perceptions much more than

neutralize his impulse to take bait fr n th ng that reminded him of that trap If a boy sees a fat hopping toad
(especially if with other boys) to sm
pulse we may suppose him blindly to
the dying toad s clasped hands suggests the meanness of the act or reminds him of sayings he has heard about the sufferings of animals being like his own so that when next he is tempted by a toad an idea arises which far from spurring him again to the torment prompts kindly actions and may even make him the toad s champion against less reflecting boys
ll endowed an animal may ori inally

associations inferences and expectations on any
O on which he has an instinctive impulse to react in the manner A would *di ectly* provoke him to that reaction But O has meantime become for him a *sign* of the nearness of P on which he has an equally stron impulse to react in the manner B quite unlike A So that when he meets O the immediate impulse A h east for the mastery The fatality

any instinct about the object O Yet how false this judgment
instinct about O is there only by the complication of the associative machinery it has come into conflict with another instinct about P

Here we immediately reap the good fruits of our simple physiological conceptio of what an instinct is If it be a mere excito-motor impulse due to the pre-existence of a certain reflex arc in the nerve-centres of the creature of c urse it must follow the law of all such reflex arcs One liability of such arcs is to have their activity inhibited by other processes going on at the same time It makes no diffe ence whether the arc be organized at birth or ripen spontaneously later or be due to acquired habit it must take its chances with all the other arcs and sometimes succeed and sometimes fail in drafting off the currents through itself The mystical v ew of an instinct would make it invariable The physiological view would require it to show occas onal irregularities in any an mal in whom the number of separate instincts and the possible entrance of the same stimulus into several of them were great And such irregularities are what e ery superior animal s instincts do how in abundance

Wherever the mind is elevated enough to discriminate wherever several distinct sensory elements must combine to discharge the reflex arc wherever inste d of plumping into action instantly at the first rough ntimation of what *sort* of a thing is there the agent waits to see which *one* of its kind it is and what the

In the instincts f mammals, and ven f low creat es, th unif rmity and infalli b which ge rali g w re n d ed as s tial characters d t exist. Th min ter st dy f ec t y ars has f und tinuity transiti ariati n, and mistake, where it has looked f them, and decided that what is called an instinct is usually nly t ndency t ct in way f which the er g is pretty constant b t which eed t be math matically true *Cf* this point Darwin *Th O* *f Sp cie* R manes *M tal E* l tion chaps xi xv incl and Appendix W L Lindsay *Mind* *Lower Animals* vol pp 33 4 n, chaps. xx and K Semper *C ndi ons f Exist nce Animals* whe gre t many instances will be f und.

of the incubating impulse The propensity of the cuckoo and of the cow bird to lay their eggs in the nests of other species must also be interpreted as a pure perception impulse These birds have no bodily disposition to become broody and there is therefore in them no connection between the perception of an egg and the impulse to sit upon it Eggs ripen however in their oviducts and the body tends to get rid of them. And since the two birds just named do not drop their eggs anywhere on the ground, but in nests which are the only places where they may preserve the pecies it might easily appear that such preservation of the species was what they had in view and that they acted with full consciousness of the purpose But this is not so The cuckoo is simply excited by the perception of quite determinate sorts of nest which already contain eggs to drop her own into them and throw the others out because this perception is a direct stimulus to these acts It is impossible that she should have any notion of the other bird coming and sitting on her egg [1]

Instincts Not Always Blind or Invariable

Remember that nothing is said yet of the origin of instincts but only of the constitution of those that exist fully formed How stands it with the instincts of mankind?

Nothing is commoner than the remark that Man differs from lower creatures by the almost total absence of instincts and the assumption of their work in him by reason A fruitless discussion might be waged on this point by two theorizers who were careful not to define their terms Reason might be used as it often has been since Kant not as the mere power of inferring but also as a name for the *tendency to obey impulses* of a certain lofty sort such as duty or universal ends And instinct might have its significance so broadened as to cover all impulses whatever even the impulse to act from the idea of a distant fact as well as the impulse to act from a present sensation Were the word instinct used in this broad way it would of course be impossible to restrict it as we began by doing to actions done with no prevision of an end We must of course avoid a quarrel about words and the facts of the case are really tolerably plain Man has a far greater variety of *impulses* than any lower animal and any one of these impulses taken in itself is as blind as the lowest instinct can be but owing to man s memory power of reflection and power of inference they come each one to be felt by him after he has once yielded to them and experienced their results in connection with a *foresight* of those results In this condition an impulse acted out may be said to be acted out in part at least *for the sake* of its results It is obvious that *every instinctive act in an animal with memory must cease to be blind after being once repeated* and must be accompanied with foresight of its end just so far as that end may have fallen under the animal s cognizance An insect that lays her eggs in a place where she never sees them hatched must always do so blindly but a hen who has already hatched a brood can hardly be assumed to sit with perfect blindness on her second nest Some expectation of consequences must in every case like this be aroused and this expectation according as it is that of something desired or of something disliked must necessarily either re enforce or inhibit the mere impulse The hen s idea of the chickens would probably encourage her to sit a rat s memory on the other hand of a former escape from a trap would

[1] *Der Th ersche W lle* pp 282–283

Two Principles of Non-uniformity in Instincts

Were one devising an abstract scheme, nothing would be easier than to discover from an animal's actions just how many instincts he possessed. He would react in one way only upon each class of objects with which his life had to deal; he would react in identically the same way upon every specimen of a class; and he would react invariably during his whole life. There would be no gaps among his instincts; all would come to light without perversion or disguise. But there are no such abstract animals, and nowhere does the instinctive life display itself in such a way. Not only, as we have seen, may objects of the same class arouse reactions of opposite sorts in consequence of slight changes in the circumstances, in the individual object, or in the agent's inward condition; but two other principles, of which we have not yet spoken, may come into play and produce results so striking that observers as eminent as Messrs. D. A. Spalding and Romanes do not hesitate to call them 'derangements of the mental constitution,' and to conclude that the instinctive machinery has got out of gear.

These principles are those

1) Of the *inhibition of instincts by habits*; and
2) Of the *transitoriness of instincts*.

Taken in conjunction with the two former principles—that the same object may excite ambiguous impulses, or *suggest* an impulse different from that which it *excites*, by suggesting a remote object—they explain any amount of departure from uniformity of conduct, without implying any getting out of gear of the elementary impulses from which the conduct flows.

1) The law of inhibition of instincts by habits is this: *When objects of a certain class elicit from an animal a certain sort of reaction, it often happens that the animal becomes partial to the first specimen of the class on which it has reacted, and will not afterward react on any other specimen.*

The selection of a particular hole to live in, of a particular mate, of a particular feeding-ground, a particular variety of diet, a particular anything, in short, out of a possible multitude, is a very wide-spread tendency among animals, even those low down in the scale. The limpet will return to the same sticking-place in its rock, and the lobster to its favorite nook on the sea-bottom. The rabbit will deposit its dung in the same corner; the bird makes its nest on the same bough. But each of these preferences carries with it an insensibility to other opportunities and occasions—an insensibility which can only be described physiologically as an inhibition of new impulses by the habit of old ones already formed. The possession of homes and wives of our own makes us strangely insensible to the charms of those of [illegible] re adventurous in [illegible] disgusting in a [illegible] think cannot be [illegible] etc. The original [illegible] seems to exhaust [illegible] ements and to leave no surplus energy for reacting on new cases. And so it comes about that, witnessing this torpor, an observer of mankind might say that no *instinctive* propensity toward certain objects ex

circumstances are of its appearance wherever different individuals and different circumstances can impel him in different ways wherever these are the conditions—we have a masking of the elementary constitution of the instinctive life The whole story of our dealings with the lower wild animals is the history of our taking advantage of the way in which they judge of everything by its mere label as it were so as to ensnare or kill them Nature, in them has left matters in this rough way and made them act *always* in the manner which would be *oftenest* right There are more worms unattached to h
paled upon them therefore on t
at every
lives more the same ob
species each
the friend or the rival accord
of another since any
with weal or

thus greediness and suspicion
coyness and desire bashfulness and vanity sociability and pugnacity seem to shoot over into each othe
in as unstable equilibri

then is an instinct as instincts
But they contradict each other— experience in each particular opportunity of application usually deciding the issue *The animal that exhibits them loses the instinctive demeanor* and appears to lead a life of hesitation and choice an intellectual life *not however because he has no instincts—rather because he has so many that they block each other's path*

Thus then without troubling ourselves about the words instinct and reason we may confidently say that however uncertain man's reactions upon his environment may sometimes seem in comparison with those of lower creatures the uncertainty is probably not due to their possession of any principles of action which he lacks *On the contrary man possesses all the impulses that they have and a great many more besides* In other words there is no material antagonism between instinct and reason Reason *per se* can ulses the only thing that can ne Reason

ve animal would be

Let us now turn to h

ity of conduct But in man
in the light of what has been said it is obvious that an existing impulse may not always be superficially apparent even when its object is there And we shall see that some impulses may be masked by causes of which we have not yet spoken

Whatever might have been the meaning of this marked change in their mental constitution—had they been unhooded on the previous day they would have run to me instead of from me—it could not have been the effect of experience; it must have resulted wholly from changes in their own organization.[1]

Their case was precisely analogous to that of the Adirondack calves. The two opposite instincts relative to the same object ripen in succession. If the first one engenders a habit, that habit will inhibit the application of the second instinct to that object. All animals are tame during the earliest phase of their infancy. Habits formed then limit the effects of whatever instincts of wildness may later be evolved.

Mr. Romanes gives some very curious examples of the way in which instinctive tendencies may be altered by the habits to which their first "objects" have given rise. The cases are a little more complicated than those mentioned in the text, inasmuch as the object reacted on not only starts a habit which inhibits other kinds of impulse toward it (although such other kinds might be natural), but even modifies by its own peculiar conduct the constitution of the impulse which it actually awakens.

Two of the instances in question are those of hens who hatched out broods of chicks after having (in three previous years) hatched ducks. They strove to coax or to compel their new progeny to enter the water, and seemed much perplexed at their unwillingness. Another hen adopted a brood of young ferrets which, having lost their mother, were put under her. During all the time they were left with her she had to sit on the nest, for they could not wander like young chicks. She obeyed their hoarse growling as she would have obeyed her chickens' peep. She combed out their hair with her bill, and "used frequently to stop and look with one eye at the wriggling nestful, with an inquiring gaze, expressive of astonishment." At other times she would fly up with a loud scream, doubtless because the orphans had nipped her in their search for teats. Finally, a Brahma hen nursed a young peacock during the enormous period of *eighteen months*, and never laid any eggs during all this time. The abnormal degree of pride which she showed in her wonderful chicken is described by Dr. Romanes as ludicrous.[2]

This leads us to the *law of transitoriness*, which is this: *Many instincts ripen at a certain age and then fade away*. A consequence of this law is that if, during the time of such an instinct's vivacity, objects adequate to arouse it are met with, a habit of acting on them is formed, which remains when the original instinct has passed away; but that if no such objects are met with, then no habit will be formed; and, later on in life, when the animal meets the objects, he will altogether fail to react, as at the earlier epoch he would instinctively have done.

No doubt such a law is restricted. Some instincts are far less transient than others—those connected with feeding and "self-preservation" may hardly be transient at all, and some, after fading out for a time, recur as strong as ever; e.g. the instincts of pairing and rearing young. The law, however, though not absolute, is certainly very widespread, and a few examples will illustrate just what it means.

In the chickens and calves above mentioned, it is obvious that the instinct to follow and become attached fades out after a few days, and that the instinct

[1] Ibid., p. 253.

[2] For the cases in full see *Mental Evolution in Animals*, pp. 3–7.

isted at all It existed but it existed *miscellaneously* or as an instinct pure and simple only before habit was formed A habit once grafted on an instinctive tendency restricts the range of the tendency itself and keeps us from reactin on any but the habitual object although other objects might just as well have been chosen had they been the first comers

Another sort of arrest of instinct by habit is where the same class of objects awakens contrary instinctive impulses Here the impulse first followed toward a given individual of the class is apt to keep him from ever awakening the opposite impulse in us In fact the whole class may be protected by this individual specimen from the application to it of the other impulse Animals for example, awaken in a child the opposite impulses of fearing and fondling But if a child, in his first attempt to pat a dog gets snapped at or bitten so that the impulse of fear is strongly aroused it may be that for years to come no dog will excite in him the impulse to fondle again On the other hand the greatest natural enemies if carefully introduced to each other when young and guided at the outset by superior authority settle down into those happy families of friends which we see in our menageries Young animals immediately after birth have no instinct of fear but show their dependence by allowing themselves to be freely handled Later however they grow wild and if left to themselves will not let man approach them I am told by farmers in the Adirondack wilderness that it is a very serious matter if a cow wanders off and calves in the woods and is not found for a week or more The calf by that time is as wild and almost as fleet as a deer and hard to capture without violence But calves rarely show any particular wildness to the men who have been in contact with them during the first days of their life when the instinct to attach themselves is uppermost, nor do they dread strangers as they would if brought up wild

Chickens give a curious illustration of the same law Mr Spalding s wonderful article on instinct shall supply us with the facts These little creatures show opposite instincts of attachment and fear either of which may be aroused by the same object man If a chick is born in the absence of the hen it

> will follow any moving object And when guided by sight alone they seem to have no more disposition to follow a hen than to follow a duck or a human being Unreflecting lookers on when they saw chickens a day old running after me [says Mr Spalding] and older ones *following me for miles and answering to my whistle* imagined that I must have some occult power over the creatures whereas I had simply allowed them to follow me from the first There is the instinct to follow and the ear prior to experience attaches them to the right object [1]

But if a man presents himself for the first time when the instinct of *fear* is strong the phenomena are altogether reversed Mr Spalding kept three chickens hooded until they were nearly four days old and thus describes their behavior

> Each of them on being unhooded evinced the greate t terror to me dashing off in the opposite direction whenever I sought to approach it The table on which they were unhooded stood before a window and each in its turn beat against the window like a wild bird One of them darted behi
> corner remained cowering for a length of t
> strange and exceptional wildne s but the

[1] Spalding in *Macmillan s Maga e* Feb 1873 p. 87

st dy the hab ts of animals In the autumn before the winter sets in adult squirrels bury as many nuts as they can collect separately in the ground H lding the nut firmly between their teeth they first scratch a hole in the ground and after pointing their ears in all di ections to convi ce themselves that no enemy is near they ram—the head with the nut still between the front teeth serving as a sledge-hammer—the nut into the ground and then fill up the hole by means of their paws The whole p ocess is executed with great rap dity and, as t appeared to me always with exactly the same mo ements n fact it is done so well that I could never discover the traces of the b rial g und. Now as regards the young squirrel which of cou se never had been p esent at the bur al of a nut I observed that after having eaten a number of

ut between ts teeth upon the bla ket and finally pe form all the motio s required to fill up a h le— *the air* after which it would jump away leaving the nut of cour e uncovered.

The anecdote of course illustrates beautifully the close relation of instinct to reflex action—a particular perception calls forth particular movements and that is all Dr Schmidt writes me that the squirrel in question soon passed away from his observation It may fairly be presumed that if he had been long reta ned prisoner in a cage he would soon have forgotten his gesticulations over the hickory nuts

if such a

ıre this pe-

Leaving lower animals aside and turning to human instincts we see the law of trans ency corroborated on the widest scale by the alternation of different interests and passions as human life goes on With the ch ld life is all play and

with the youth it

eal world boon fel

adventure science

acquisitiveness responsi

If a boy grows up alone

ay ball nor row nor sail

ll be sedentary to the end

e afforded him for learning these things later it is a hundred to one but he will pass them by and shrink back from the effort of taking those necessary first steps the prospect of which at an earlier age would have filled him with eager delight The sexual passion expires after a protracted reign but it is well known that its peculiar manifesta tions in a given individual depend almost entirely on the habits he may form during the early period of its activity Exposure to bad company then makes him

ter

as an instinct ent rely pp essed. See simila bserv ti gain as h w ld h d H re St bling *Essay* *Darwinism* (Lo d n, 187) p 73 d kh g in T R R.

of flight then takes it place the conduct of the creature toward man being decided by the formation or non formation of a certain habit during those days The transiency of the chicken s instinct to follow is also proved by its conduct toward the hen Mr Spalding kept some chickens shut up till they were comparatively old and speaking of these, he says

> A chicken that has not heard the call of the mother till until eight or ten days old then hears it as if it heard it not I regret to find that on this point my notes are not so full as I could wish or as they might have been There is however an account of one chicken that could not be returned to the mother when ten days old The hen followed it and tried to entice it in every way still it continually left her and ran to the house or to any person of whom it caught sight This it persisted in doing though beaten back with a small branch dozens of times and indeed cruelly maltreated It was also placed under the mother at night but it again left her in the morning

The instinct of sucking is ripe in all mammals at birth and leads to that habit of taking the breast which in the human infant, may be prolonged by daily exercise long beyond its usual term of a year or a year and a half But the instinct itself is transient in the sense that if for any reason the child be fed by spoon during the first few days of its life and not put to the breast, it may be no easy matter after that to make it suck at all So of calves If their mother die or be dry or refuse to let them suck for a day or two so that they are fed by hand it becomes hard to get them to suck at all when a new nurse is provided The ease with which sucking creatures are weaned by simply breaking the habit and giving them food in a new way, shows that the instinct purely as such must be entirely extinct

Assuredly the simple fact that instincts are transient, and that the effect of later ones may be altered by the habits which earlier ones have left behind, is a far more philosophical explanation than the notion of an instinctive constitution vaguely deranged or thrown out of gear'

I have observed a Scotch terrier, born on the floor of a stable in December and transferred six weeks later to a carpeted house make when he was less than four months old a very elaborate pretence of burying things such as gloves etc with which he had played till he was tired He scratched the carpet with his forefeet dropped the object from his mouth upon the spot and then scratched all about it (with both fore and hind feet if I remember rightly) and finally went away and let it lie Of course the act was entirely useless I saw him perform it at that age some four or five times and never again in his life The conditions were not present to fix a habit which should last when the prompting instinct died away But suppose meat instead of a glove earth instead of a carpet hungerpangs instead of a fresh supper a few hours later and it is easy to see how this dog might have got into a habit of burying superfluous food which might have lasted all his life Who can swear that the strictly instructive part of the food burying propensity in the wild *Canidæ* may not be as short lived as it was in this terrier?

A similar instance is given by Dr H D Schmidt[1] of New Orleans

> I may cite the example of a young squirrel which I had tamed a number of years ago when serving in the army and when I had sufficient leisure and opportunity to

[1] *Transactions of the American Ne olog cal Associat on* vol. 1 p 129 (1875)

said is a somewh
jects go no further
when a novel obje
ing apparatus of
nary reflex actions ...
ii ir Other actions take effect upon the outer world s ... ...
mind do etc On the whole it is best

presence of specific sorts of outward fac

Professor Preyer in his careful little work *Die Seele des Kindes* says, Instinctive acts are in man few in number and apart from those connected with the sexual passion difficult to recognize after early youth is past And he adds, So much the more attention should we pay to the instinctive movements of new born bab ... d sm ll children That instinctive acts should be easiest ecog
of tran torm
we shall see ... ...

Preyer divides the movements of infants into *impulsive reflex* and ins e By impulsi e mo ements he means *random* movements of limbs body and voice with no aim and before perception is aroused Among the first reflex mo ements are *cry ng on contact w th the air snee i g snuffling snoring cough g s gh g sobbi g gaggi g vomit n hiccup ng starti g mo ing the l mbs whe t ckled to ched or blown upon* etc etc.

Of the movements called by him instincti e in the child Professor Preyer gi es a full account Herr Schneider does the same and as their descriptions agree with each other and with what other writers about infancy say I will base my own very brief statement on theirs.

S ck g almost perfect at birth not coupled with any con enital tendency to *seek* the breast this bein a later acquis tion As we have seen sucking is a transitory instinct

Bit g an object placed in the mouth *chewi g* and *gri d ng the teeth licking* s m makin characteristic *grimaces* over bitter and sweet tastes *spitti* out

—

in sucking p tting-out etc and with the reflex act of swallowin leads in the indi dual to a set of habits which constitute his *function of alimentat on* and which may may not be gradually modified as life goes on.

Cry g at bodily discomfort hunger or pain and at solitude *Sm l g* at being noticed fondled or smiled at by others It seems very doubtful whether young infants have any instinctive fear of a terrible or scowling face I have been unable to make my own children under a year old change their expression when

a loose liver all his days chastity kept at first makes the same easy later on In all pedagogy the great thing is to strike the iron while hot and to seize the wave of the pupil s interest in each successive subject before its ebb has come so that knowledge may be got and a habit of skill acquired—a headway of interest in short secured, on which afterward the individual may float There is a happy moment for fixing skill in drawing for making boys collectors in natural history, and presently dissectors and botanists then for initiating them into the harmonies of mechanics and the wonders of physical and chemical law Later introspective psychology and the metaphysical and religious mysteries take their turn and last of all the drama of human affairs and worldly wisdom in the widest sense of the term In each of us a saturation point is soon reached in all these things the impetus of our purely intellectual zeal expires and unless the topic be one associated with some urgent personal need that keeps our wits constantly whetted about it we settle into an equilibrium and live on what we learned when our interest was fresh and instinctive without adding to the store Outside of their own business the ideas gained by men before they are twenty five are practically the only ideas they shall have in their lives They *cannot* get anything new Disinterested curiosity is past the mental grooves and channels set the power of assimilation gone If by chance we ever do learn anything about some entirely new topic we are afflicted with a strange sense of insecurity and we fear to advance a resolute opinion But with things learned in the plastic days of instinctive curiosity we never lose entirely our sense of being at home There remains a kinship a sentiment of intimate acquaintance which even when we know we have failed to keep abreast of the subject flatters us with a sense of power over it and makes us feel not altogether out of the pale Whatever individual exceptions might be cited to this are of the sort that prove the rule

To detect the moment of the instinctive readiness for the subject is then the first duty of every educator As for the pupils it would probably lead to a more earnest temper on the part of college students if they had less belief in their unlimited future intellectual potentialities and could be brought to realize that whatever physics and political economy and philosophy they are now acquiring are for better or worse the physics and political economy and philosophy that will have to serve them to the end

The natural conclusion to draw from this transiency of instincts is that *most instincts are implanted for the sake of giving rise to habits and that this purpose once accomplished the instincts themselves as such have no raison d etre in the psychical economy and consequently fade away* That occasionally an instinct should fade before circumstances permit of a habit being formed or that if the habit be formed other factors than the pure instinct should modify its course need not surprise us Life is full of the imperfect adjustment to individual cases of arrangements which taking the species as a whole are quite orderly and regular Instinct cannot be expected to escape this general risk

Special Human Instincts

Let us now test our principles by turning to human instincts in more detail We cannot pretend in these pages to be minute or exhaustive But we can say

the failures but to the fact that the animal is beginning his attempts before the co-ordinating centres have quite ripened for their work Mr Spalding s observa tions on this point are conclusive as to birds

Birds [he says] do not *learn* to fly Two years ago I shut up five unfledged swallows in a small box not much larger than the nest fr m which they were taken. The little box which had a w re front, was hung on the wall near the nest, and the young s allows were fed by their parents thr ugh the wires In this confinement where th y could not even extend their wings they were kept until afte they we e fully fledged The remaining four

O go ng to set the prisoners free one was found dead were allo ed to escape o e at a time Two of these we e perceptibly wa ering and unsteady in the r fl ght. One of them after a flight of some ninety ya ds disappeared among ome trees [No 3 and N 4] ne er flew gainst anything nor was there in their a o ding objects any app ciable diffe ence between them and the old b rds No 3 wept ound the Wellingtoni a d No 4 rose o er the hedge just as we see the old swallows doing every hour of the d Th th s summer verified these observations Of two swallows I had similarly c lo e t the ground r se in the dir it was seen for a cons derable tim nificent evol tio s in the ai high the air w th its wing mo than t. mice tomtits a d wrens I ha e made the ubjects of similar observations nd with similar esults.

m well be tempted to make a prediction

al fe h e

ing subject *Cl mbing* on trees fences furniture banisters etc is a well marked instinctive propensity which ripens after the fourth year

Vocali ation This may be either musical or significant Very few weeks after birth the baby begins to express its spir ts by emitting vowel sounds as much

and again w th the most evident pleasure at his new power At this time it is qu te impossible to talk *with* him for his condit on is that of echolalia —in stead of answering the question he simply reiterates it The result is however

he has become a speaking animal The interesting point with regard to this in-

Natur xii, p. 5 7 (875)

I changed mine at most they manifested attention or curiosity Preyer instances a *protrusion of the lips* which, he says may be so great as to remind one of that in the chimpanzee as an instinctive expression of concentrated attention in the human infant

Turning the head aside as a gesture of rejection, a gesture usually accompanied with a frown and a bending back of the body, and with holding the breath

Holding head erect

Sitting up

Standing

Locomotion The early movements of children s limbs are more or less symmetrical Later a baby will move his legs in alternation if suspended in the air But until the impulse to walk awakens by the natural ripening of the nerve centres it seems to make no difference how often the child s feet may be placed in contact with the ground the legs remain limp and do not respond to the sensation of contact in the soles by muscular contractions *pressing downwards* No sooner however is the standing impulse born than the child stiffens his legs and presses downward as soon as he feels the floor In some babies this is the first locomotory reaction In others it is preceded by the instinct to *creep* which arises as I can testify often in a very sudden way Yesterday the baby [illegible] ontent dl wherever he was put to day it has become impossible to

[illegible]

dauntless and he ends in a few days by learning to travel rapidly around the room in the quadrupedal way The position of the legs in creeping varies much from one child to another My own child when creeping was often observed to pick up objects from the floor with his mouth a phenomenon which as Dr O W Holmes has remarked like the early tendency to grasp with the toes easily lends itself to interpretation as a reminiscence of prehuman ancestral habits

The walking instinct may awaken with no less suddenness and its entire education be completed within a week s compass barring of course a little grogginess' in the gait Individual infants vary enormously but on the whole it is safe to say that the mode of development of these locomotor instincts is inconsistent with the account given by the older English Associationist School of *their being results of the individual s education* due altogether to the gradual association of cr [illegible] nt ons with certain haphazard movements and certain resultant

new born lambs

But the observation recorded proves the faculty to be almost perfect from first and all others who have observed new born calves lambs and pigs agree that in these animals the powers of standing and walking and of interpreting the topographical significance of sights and sounds are all but fully developed at birth Often in animals who seem to be learning to walk or fly the semblance is illusive The awkwardness shown is not due to the fact that experience has not yet been there to associate the successful movements and exclude

[1] *The Senses and the Intellect* 3d ed. pp 413–675

Listed, it had every appearance of being the automatic result of ideas, often suggested by perceptions, working out irresistible motor effects. Imitation shades into

Emulation or Rivalry a very intense instinct especially rife with young children, or at least especially undisguised. Everyone knows it. Nine-tenths of the work of the world is done by it. We know that if we do not do the task someone else will do it and get the credit so we do it. It has very little connection with sympathy b t rather more with pugnacity which we proceed in turn to consider

Pugnacity anger resentment In many respects man is the most ruthlessly ferocious of beasts. As with all gregarious animal two souls, as Faust says, dwell within his breast, the one of sociability and helpfulness, the other of jealousy and antagonism to his mates. Though in a general way he cannot live without them yet, as regards certain individuals it often falls out that he cannot live with them either Constrained to be a member of a tribe he till has a right to decide as far as in him lies of which other members the tribe shall consist. Killing off a few obnoxious ones may often better the chances of those that remain. And killing off a neighboring tribe from whom no good thing comes but only competition, may materially better the lot of the whole tribe. Hence the gory cradle the *bellum omnium contra omnes* in which our race was reared hence the fickleness of human ties, the ease with which the foe of yesterday becomes the ally of to-day the friend of to-day the enemy of to-morrow hence the fact that we the lineal representatives of the successful enactors of one scene of slaughter after another must, whatever more pacific virtues we may also possess, till carry about with us ready at any moment to burst into flame the smouldering and sinister traits of character by means of which they lived through so many massacres, harming others, but themselves unharmed

Sympathy is an emotion as to whose instinctiveness psychologists have held hot debate, some of them contending that it is no primitive endowment, but, originally t least, the result of a rapid calculation of the good consequences to ourselves of the sympathetic act. Such a calculation at first conscious, would grow more unconscious as it became more habitual and at last tradition and association aiding might prompt to acts ns which could not be distinguished from immediate impulses. It is hardly needful to argue against the falsity of this view Some forms of sympathy that of mother with child, for example are surely primitive and not intelligent forecasts of board and lodging and other support to be reaped in old age Danger to the child blindly and instantaneously stimulates the mother to actions of alarm or defence. Menace or harm to the adult beloved or friend excites us in a corresponding way often against all the dictates of prudence It is true that sympathy does not necessarily follow from the mere fact of gregariousness. Cattle do not help a wounded comrade on the contrary they are more likely to dispatch him But a d will t her sick dog and

...y many observa
...sight of suffering
...diate stimulus, if
...unaccountable or
...essor Bain's assimilation of it to the fixed ideas of insanity as clashing with the regular out-goings of the will."

stinct is the oftentimes very sudden birth of the impulse to imitate sounds Up to the date of its awakening the child may have been as devoid of it as a dog Four days later his whole energy may be poured into this new channel The habits of articulation formed during the plastic age of childhood are in most persons sufficient to inhibit the formation of new ones of a fundamentally dif ferent sort—witness the inevitable foreign accent which distinguishes the speech of those who learn a language after early youth

Imitation The child s first words are in part vocables of his own invention which his parents adopt and which as far as they go form a new human tongue upon the earth and in part they are his more or less successful imitations of words he hears the parents use But the instinct of *imitating gestures* develops earlier than that of imitating sounds —unless the sympathetic crying of a baby when it hears another cry may be reckoned as imitation of a sound Professor Preyer peaks of his child imitating the protrusion of the father s lips in its fif teenth week The various accomplishments of infancy making pat a cake saying bye-bye blowing out the candle etc usually fall well inside the limits of the first year Later come all the various imitative games in which childhood revels playing horse soldiers etc etc And from this time on ward man is essentially *the* imitative animal His whole educability and in fact the whole history of civilization depend on this trait which his strong tenden cies to rivalry jealousy and acquisitiveness reinforce *Humani nihil a me ali enum puto* is the motto of each individual of the species, and makes him when ever another individual shows a power or superiority of any kind restless until he can exhibit it himself But apart from this kind of imitation of which the psychological roots are complex there is the more direct propensity to speak and walk and behave like others usually without any conscious intention of so do-ing And there is the imitative tendency which shows itself in large masses of men and produces panics and orgies and frenzies of violence and which only the rarest individuals can actively withstand This sort of imitativeness is pos sessed by man in common with other gregarious animals and is an instinct in the fullest sense of the term being a blind impulse to act as soon as a certain perception occurs It is particularly hard not to imitate gaping laughing or looking and running in a certain direction if we see others doing so Certain mesmerized subjects must automatically imitate whatever motion their operator makes before their eyes [1] A successful piece of mimicry gives to both bystanders and mimic a peculiar kind of æsthetic pleasure The dramatic impulse the tend ency to pretend one is someone else contains this pleasure of mimicry as one of its elements Another element seems to be a peculiar sense of power in stretch ing one s own personality so as to include that of a strange person In young children this instinct often knows no bounds For a few months in one of my children s third year he literally hardly ever appeared in his own person It was always Play I am So and so and you are So and so and the chair is such a thing and then we ll do this or that If you called him by his name H you in variably got the reply I m not H I m a hyena or a horse car or whatever the feigned object might be He outwore this impulse after a time but while it

[1] See for some e cellent pedagogic remarks about *do ng y u s lf* what you want to get your pupils to do and not simply telling them to do it B mann *H ndb ch der Moral* (1879) p 32 ff

just because human bloodthirstiness is such a primitive part of us that it is so hard to eradicate especially where a fight or a hunt is promised as part of the fun.

As La Rochefoucauld says there is something in the misfortunes of our very friends that does not altogether displease us and an apostle of peace will feel a certain vicious thrill run through him and enjoy a vicarious brutality as he turns to the column in his newspaper at the top of which Shocking Atrocity stands printed in large capitals See how the crowd flocks round a street brawl! Consider the enormous annual sale of revolvers to persons not one in a thousand of whom has any serious intention of using them but of whom each one has his carnivorous self consciousness agreeably tickled by the notion as he clutches the handle of his weapon that he will be rather a dangerous customer to meet. [illegible] great pugilist—parasites who feel as if

[illegible]

spectator sick but his blood is soon up in favor of one [illegible] seem as if the other fellow could not be banged and pounded and mangled enough—the refined spectator would like to reinforce the blows himself Over the sinister orgies of blood of certain depraved and insane persons let a curtain be drawn as well as over the ferocity with which otherwise fairly decent men may be animated when (at the sacking of a town for instance) the excitement of victory long delayed the sudden freedom of rapine and of lust the contagion [illegible] and outdo all combine to swell the blind

[illegible]

associated with them in the imagination have missed the root [illegible] ferocity is blind and can only be explained *from below* Could we trace it back

[illegible]

an batt [illegible] in Paris. Th[e] man whose case I have b[ro]ught [illegible] had th[e] sam[e] passi[on] for gloating [illegible] blood, b[u]t had no [a]ttack [o]f cut mania. Th[e] sight [o]f blood wa[s] distin[c]tly delight[ful] [to] him and [a]t any time blood ar[o]used in him th[e] w[o]rst elem[en]t [o]f his nat[u]re Instances will easily be recalled in [which] m[u]rd[e]rers, [a]nd [o]b[vious]ly insan[e] ha[v]e descr[i]bed the intense pleas[u]re they experie[nc]ed in the warm blood [o]f children.

It may be as primitive as any other outgoing, and may be due to a random variation selected quite as probably as gregariousness and maternal love are, even in Spencer s opinion due to such variations

It is true that sympathy is peculiarly liable to inhibition from other instincts which its stimulus may call forth The traveller whom the good Samaritan rescued may well have prompted such instinctive fear or disgust in the priest and Levite who passed him by that their sympathy could not come to the front Then of course habits reasoned reflections and calculations may either check or reinforce one s sympathy as may also the instincts of love or hate if these exist for the suffering individual The hunting and pugnacious instincts when aroused also inhibit our sympathy absolutely This accounts for the cruelty of collections of men hounding each other on to bait or torture a victim The blood mounts to the eyes and sympathy s chance is gone [1]

The hunting instinct has an equally remote origin in the evolution of the race [2] The hunting and the fighting instinct combine in many manifestations They both support the emotion of anger they combine in the fascination which stories of atrocity have for most minds and the utterly blind excitement of giving the rein to our fury when our blood is up (an excitement whose intensity is greater than that of any other human passion save one) is only explicable as an *impulse aboriginal in character and having more to do with immediate and* overwhelming tendencies to muscular discharge than to any possible reminiscences *of effects of experience or association of ideas* I say this here because the pleasure of di

have sought to sh

resultant of the subtile combination of other less malignant elements of mind

Th hon less task If evolution and the survival of the fittest be true at all

charges and both the latter must from the nature of the case have been very violent and therefore, when unchecked of an intensely pleasurable kind It is

[1] Sympathy has been enormously written about in books on Ethics A very good recent ... part II chap II.

dei gnts n p ...
how greedy he is to steal secret dainties with what irresist ble strength the plu ... b rds nests attracts him without his hav ng the least *intention of eating the eggs* or the young birds This fact has long been fam lia and is daily remarked by teachers but an ... me n cention of the objects without

u
Hille pp 180–82)

one of the three most exciting emotions of which our nature is susceptible. The progress from brute to man is characterized by nothing so much as by the decrease in frequency of proper occasions for fear. In civilized life in particular it has at last become possible for large numbers of people to pass from the cradle to the grave without ever having had a pang of genuine fear. Many of us need an attack of mental disease to teach us the meaning of the word. Hence the possibility of so much blindly optimistic philosophy and religion. The atrocities of life become like a tale of little meaning though the words are strong; we doubt if anything like *us* ever really was within the tiger's jaws, and conclude that the horrors we hear of are but a sort of painted tapestry for the chambers in which we lie so comfortably at peace with ourselves and with the world.

Be this as it may, fear is a genuine instinct, and one of the earliest shown by the human child. *Noises* seem especially to call it forth. Most noises from the outer world, to a child bred in the house, have no exact significance. They are simply startling. To quote a good observer, M. Perez:

> Children between three and ten months are less often alarmed by visual than by auditory impressions. In cats, from the fifteenth day, the contrary is the case. A child, three and a half months old, in the midst of the turmoil of a conflagration, in presence of the devouring flames and ruined walls, showed neither astonishment nor fear, but smiled at the woman who was taking care of him, while his parents were busy. The noise, however, of the trumpet of the firemen, who were approaching, and that of the wheels of the engine, made him start and cry. At this age I have never yet seen an infant startled at a flash of lightning, even when intense; but I have seen many of them alarmed at the voice of the thunder. . . . Thus fear comes rather by the ears than by the eyes, to the child without experience. It is natural that this should be reversed, or reduced, in animals organized to perceive danger afar. Accordingly, although I have never seen a child frightened at his first sight of fire, I have many a time seen young dogs, young cats, young chickens, and young birds frightened thereby. . . . I picked up some years ago a lost cat about a year old. Some months afterward, at the onset of cold weather, I lit the fire in the grate of my study, which was her reception room. She first looked at the flame in a very frightened way. I brought her near to it. She leaped away and ran to hide under the bed. Although the fire was lighted every day, it was not until the end of the winter that I could prevail upon her to stay upon a chair near it. The next winter, however, all apprehension had disappeared. Let us then conclude that there are hereditary dispositions to fear, which are independent of experience, but which experiences may end by attenuating very considerably. In the human infant I believe them to be particularly connected with the ear.[1]

The effect of noise in heightening any terror w[illegible] . . . s is very . . . al cause . . . ucing in . . . how in . . . each . . . o . . . gust of it arrested momentarily his heart. A do[illegible] attacking

[1] *Psychologie de l'enfant*, pp. 72–4. In an account of a young gorilla quoted from Falkenstein, by R. Hartmann (*Anthropoid Apes*, International Scientific Series, vol. LII [New York, 1886], p. 65), it is said: 'He very much disliked strange noises. Thunder, the rain falling on the skylight, and especially the long-drawn note of a pipe or trumpet, threw him into such agitation as to cause a sudden affection of the digestive organs, and it became expedient to keep him at a distance. When he was slightly indisposed, we made use of this kind of music with results as successful as if we had administered purgative medicine.'

through our line of descent we should see it taking more and more the form of a fatal reflex response and at the same time becoming more and more the pure and direct emotion that it is [1]

In childhood it takes this form The boys who pull out grasshoppers legs and butterflies wings and disembowel every frog they catch have no *thought* at all about the matter The creatures tempt their hands to a fascinating occupation, to which they have to yield It is with them as with the boy fiend Jesse Pomeroy, who cut a little girl s throat just to see how she d act The normal provocatives of the impulse are all living beasts great and small toward which a contrary habit has not been formed—all human beings in whom we perceive a certain *intent* towards *us* and a large number of human beings who offend us peremptorily either by their look or gait or by some circumstance in their lives which we dislike Inhibited by sympathy and by reflection calling up impulses of an opposite kind civilized men lose the habit of acting out their pugnacious instincts in a perfectly natural way and a passing feeling of anger with its comparatively faint bodily expressions may be the limit of their physical combativeness Such a feeling as this may however be aroused by a wide range of objects Inanimate things combinations of color and sound bad bills of fare may in persons who combine fastidious taste with an irascible temperament produce real ebullitions of rage Though the female sex is often said to have less pugnacity than the male the difference seems connected more with the extent of the motor consequences of the impulse than with its frequency Women take offence and get angry if anything more easily than men but their anger is inhibited by fear and other principles of their nature from expressing itself in blows The hunting instinct proper seems to be decidedly weaker in them than in men The latter instinct is easily restricted by habit to certain objects which become legitimate game while other things are spared If the hunting instinct be not exercised at all it may even entirely die out and a man may enjoy letting a wild creature live even though he might easily kill it Such a type is now becoming frequent but there is no doubt that in the eyes of a child of nature such a personage would seem a sort of moral monster

Fear is a reaction aroused by the same objects that arouse ferocity The antagonism of the two is an interesting study in instinctive dynamics We both fear and wish to kill anything that may kill us and the question which of the two impulses we shall follow is usually decided by some one of those *collateral circumstances* of the particular case to be moved by which is the mark of superior mental natures Of course this introduces uncertainty into the reaction but it is an uncertainty found in the higher brutes as well as in men and ought not to be taken as proof that we are less instinctive than they Fear has bodily expressions of an extremely energetic kind and stands beside lust and anger as

[1] Bombonnel having rolled with a panther to the border of a ravine gets his head away from the open mouth of the animal and by a prodigious effort rolls her into the abyss He gets up blinded spitting a mass of blood not knowing exactly what the situation is He thinks only of one thing that he shall probably die of his wounds but that before dying he must take vengeance on the panther I didn t think of my pain he tells us Possessed entirely by the fury with which I was transported I drew my hunting knife and not understanding what had become of the beast I sought for her on every side in order to continue the struggle It was in this plight that the Arabs found me when they arrived (Quoted by Guyau *La Morale sans obligation* etc p 210)

High places cause fear of a peculiarly sickening sort though here again individuals differ enormously The utterly blind instinctive character of the motor impulses here is shown by the fact that they are almost always entirely unreasonable but that reason is powerless to suppress them That they are a mere incidental peculiarity of the nervous system like liability to sea sickness or love of music with no teleological significance seems more than probable The fear in question varies so much from one person to another and its detrimental effects are so much more obvious than its uses that it is hard to see how it could be a selected instinct Man is anatomically one of the best fitted of animals for climbin about high places The best psychical complement to this equipment would seem to be a level head when there not a dread of going there at all In fact the teleology of fear beyond a certain point is very dubious. Professor Mosso in his interesting monograph *La Paura* (which has been translated into French) concludes that many of its manifestations must be considered pathological rather than useful Bain in several places expresses the same opinion and this I think is surely the view which any observer without *a priori* prejudices must take. A certain amount of timidity obviously adapts us to the world we live in but the *fear paroxysm* is surely altogether harmful to him who is its prey

Fear of the supernatural is one variety of fear It is difficult to assign any normal object for this fear unless it were a genuine ghost But in spite of psychical

[illegible] error to its maximum many usual elements of the dreadful must combine such as loneliness darkness inexpl cable sounds especially of a dismal character moving figures half discerned (or if discerned of dreadful aspect) and a vertiginous baffling of the expectation. This last element which is *intellectual* is very important It produces a strange emotional curdle in our blood to see a process with which we are familiar del berately takin an unwonted course Any one s heart would stop beating if he perceived his chair sliding unassisted across the floor The lower animals appear to be sensitive to the mysteriously except onal as well as our sel es My friend Professor W K. Brooks of the Johns Hopkins University told me of his large and noble do being frightened into a sort of epileptic fit by a bone being drawn across the floor by a thread which the dog did not see Darwin and Romanes have given similar experiences The idea of the supernatural in ol es that the usual should be set at naught In the witch and hob oblin supernatural other elements still of fear are brought in—caverns slime and ooze vermin corpses and the like A human corpse seems normally to produce an instinctive dread which is no doubt somewhat due to its mysteriousness and

[1] *Cf* Romanes *Mental E* [illegible] *tc* p. 56.

In the *Overland M* [illegible] 537 most int esting article Laura Bridgman writ ings has been published by M E. C. Sandf d. Am g th reminisc ces of her early childhood, hile sh still knew thing f the sign language th w nderful blind deaf mut records th following t m in her quaint language My fathe [he was farmer and probably did his n b tchering] used to enter his kitchen bringing some killed animals in and deposited them one of sides f the room many times. As I perceived it it make me shud der ith terro because I did not know what th matter was. I hated to pproach the dead. One m ning I we t t take sh rt walk with my M ther I w t int snug h use

us is much more dreadful by reason of the noises he makes

Strange men and *strange animals* either large or small excite fear but especially men or animals advancing toward us in a threatening way This is entirely instinctive and antecedent to experience Some children will cry with terror at their very first sight of a cat or dog and it will often be impossible for weeks to make them touch it Others will wish to fondle it almost immediately Certain kinds of vermin especially spiders and snakes seem to excite a fear unusually difficult to overcome It is impossible to say how much of this difference is instinctive and how much the result of stories heard about these creatures That the fear of vermin ripens gradually seemed to me to be proved in a child of my own to whom I gave a live frog once at the age of six to eight months and again when he was a year and a half old The first time he seized it promptly and holding it in spite of its struggling at last got its head into his mouth He then let it crawl up his breast and get upon his face without showing alarm But the second time although he had seen no frog and heard no story about a frog between whiles it was almost impossible to induce him to touch it Another child a year old eagerly took some very large spiders into his hand At present he is afraid but has been exposed meanwhile to the teachings of the nursery One of my children from her birth upwards saw daily the pet pug dog of the house and never betrayed the slightest fear until she was (if I recollect rightly) about eight months old Then the instinct suddenly seemed to develop and with such intensity that familiarity had no mitigating effect She screamed whenever the dog entered the room and for many months remained afraid to touch him It is needless to say that no change in the pug s unfailingly friendly conduct had

—on waking up and finding himself alone

Black things and especially *dark places* holes caverns etc arouse a peculiarly gruesome fear This fear as well as that of solitude of being *lost* are explained after a fashion by ancestral experience Says Schneider

> It is a fact that men especially in childhood fear to go into a dark cavern or a gloomy wood This feeling of fear arises to be sure partly from the fact that we easily suspect that dangerous beasts may lurk in these localities—a suspicion due to stories we have heard and read But on the other hand it is quite sure that this fear at a certain perception is also directly inherited Children who have been carefully guarded from all ghost stories are nevertheless terrified and cry if led into a dark place especially if sounds are made there Even an adult can easily observe that an uncomfortable timidity steals over him in a lonely wood at night although he may have the fixed conviction that not the slightest danger is near
>
> This feeling of fear occurs in many men even in their own house after dark although it is much stronger in a dark cavern or forest The fact of such instinctive fear is c [illegible] hen we consider that our savage ancestors through innumerable gen[illegible]
> bears an[illegible]
> woods a [illegible]
> of caverns and woods and fear took place and was inherited[1]

[1] *Der Menschliche Wille* p 224

not due to the accidental resurrection through disease, of a sort of instinct which may in some of our ancestors have had a permanent and on the whole a useful part to play?

Appropriation or Acquisitiveness The beginnings of acquisitiveness are seen in the impulse which very young children display to snatch at or beg for any object which pleases their attention. Later when they begin to speak among the first words they emphasize are "me and mine"[1] Their earliest quarrels with each other are about questions of ownership and parents of twins soon learn that it conduces to a quiet house to buy all presents in impartial duplicate Of the later evolution of the proprietary instinct I need not speak Everyone knows how difficult a thing it is not to covet whatever pleasing thing we see and how the sweet ... of the thing often is as gall to us so long as it is another's. When another ... into the impu... ilized life the impulse to own is usually ... and only passes over into action under circumstances legitimated by habit and common consent an additional example of the way in which one instinctive tendency may be inhibited by others A variety of the proprietary instinct is the impulse to form collections of the same sort of thing It differs much in individuals and shows in a striking way how instinct and habit interact. For although a collection of any given thing —like postage-stamps—need not be begun by any given person yet the chances are that if accidentally it *be* begun by a person with the collecting instinct, it will probably be continued. The chief interest of the objects, in the collector's eyes, is that they are a collection and that they are his. Rivalry to be sure, inflames this as it does every other passion, yet the object of a collector's mania need not be necessarily such as are generally in de-

...

The associationist psychology denies that there is any blind primitive instinct to appropriate and would explain all acquisitiveness in the first instance as a desire to secure the pleasures which the objects possessed may yield and secondly as the association of the idea of pleasantness with the *holding* of the thing, even though the pleasure originally got by it was only gained through its expense or destruction. Thus the miser is shown to us as one who has transferred to the gold by which he may buy the goods of this life all the emotions which the goods themselves would yield and who thereafter loves the gold for its own sake preferring the means of pleasure to the pleasure itself There can be little doubt that much of this analysis a broader view of the facts would have dis-

[1] I lately saw a boy of five (who had been told the story of Hector and Achilles) teaching his younger brother aged three, how to play Hector whilst he himself should play Achilles, and chase him round the walls of Troy. Having armed themselves, Achilles advances, shouting, "Where is my Patroclus? Where is my Patroclus?" the word be Hector piped up, quite distracted from his rôle "Where is my Patroklos? I want a Patroklos!"—and broke up the game. Of what kind of thing Patroklos might be he had, of course, no notion—enough that his brother had one, for him to claim one too.

In The Forum for September 3, 1886, President G. S. Hall has given some account of a statistical research ... on school-boys, by Miss Wiltse, from which it appears that only ... out of two hundred and twenty-nine had made no collections.

which familiarity rapidly dispels But in view of the fact that cadaveric reptilian and underground horrors play so specific and constant a part in many nightmares and forms of delirium it seems not altogether unwise to ask whether these forms of dreadful circumstance may not at a former period have been more normal objects of the environment than now The ordinary cock sure evolutionist ought to have no difficulty in explaining these terrors and the scenery that provokes them as relapses into the consciousness of the cave-men a consciousness usually overlaid in us by experiences of more recent date

There are certain other pathological fears and certain peculiarities in the expression of ordinary fear which might receive an explanatory light from ancestral conditions, even infra human ones In ordinary fear one may either run or remain semi paralyzed The latter condition reminds us of the so called death shamming instinct shown by many animals Dr Lindsay in his work *Mind in Animals* says this must require great self command in those that practise it But it is really no feigning of death at all and requires no self command It is simply a terror paralysis which has been so useful as to become hereditary The beast of prey does not think the motionless bird insect or crustacean dead He simply fails to notice them at all because his senses like ours are much more strongly excited by a moving object than by a still one It is the same instinct which leads a boy playing I spy to hold his very breath when the seeker is near and which makes the beast of prey himself in many cases motionlessly lie in wait for his victim or silently stalk it by rapid approaches alternated with periods of immobility It is the opposite of the instinct which makes us jump up and down and move our arms when we wish to attract the notice of some one passing far away and makes the shipwrecked sailor frantically wave a cloth upon the raft where he is floating when a distant sail appears Now may not the statue-like crouching immobility of some melancholiacs insane with general anxiety and fear of everything be in some way connected with this old instinct? They can give no *reason* for their fear to move but immobility makes them feel safer and more comfortable Is not this the mental state of the feigning' animal?

Again take the strange symptom which has been described of late years by the rather absurd name of *agoraphobia* The patient is seized with palpitation and terror at the sight of any open place or broad street which he has to cross alone He trembles his knees bend he may even faint at the idea Where he has sufficient self command he sometimes accomplishes the object by keeping safe under the lee of a vehicle going across or joining himself to a knot of other people But usually he slinks round the sides of the square hugging the houses as closely as he can This emotion has no utility in a civilized man but when we notice the chronic agoraphobia of our domestic cats and see the tenacious way in which many wild animals, especially rodents cling to cover and only venture on a dash across the open as a desperate measure—even then making for every stone or bunch of weeds which may give a momentary shelter—when we see this we are strongly tempted to ask whether such an odd kind of fear in us be

for some time They took me nto a room where the was a coffin I put my hand in the coffin & felt som thing so queer It f ghten d m unpleasantly I found something dead wrapped in a silk h d'k f so ca f lly It must have been a body th t had had vitality I did not like to v nture to examine the body f I was confound d

not due to the accidental resurrection through disease of a sort of instinct which may in some of our ancestors have had a permanent and on the whole a useful part to play?

Appropriation or *Acqu s t eness* The beginnings of acquisitiveness are seen in the impulse which very young children display to snatch at or beg for any object which pleases their attention Later when they begin to speak among the first words they emphasize are me and mine [1] Their earliest quarrels with each other are about questions of ownersh p and parents of twins soon learn that it conduces to a qu et house to buy all presents in impartial duplicate Of the later e olution of the proprietary instinct I need not speak Everyone knows how difficult a thing it is not to covet whatever pleasing thing we see and how the sweetness of the thing often is as gall to us so long as it is another's When another is in possession the impulse to appropriate the thing often turns into the impulse to harm him—what is called *envy* or *jealousy* ensues In civilized life the impul e to own is usually checked by a variety of con iderations and only passes over into action under circumstances legitimated by habit and common consent an additional example of the way in which one instinctive tendency may be inhibited by others A variety of the proprietary instinct is the impulse to form collections of the same sort of thin It differs much in individuals and shows in a striking way how instinct and habit interact For although a collect on of any gi en thin —like postage-stamps—need not be begun by any

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mand Boys will collect anythin that they see another boy collect from pieces of chalk and peach pits up to books and photographs Out of a hundred students whom I questioned only four or five had ne er collected h t

se te the pleasures which the objects possessed may yield and secondly as the associati n of the idea of pleasantness with the *holding* of the th even th ugh the pleasure originally got by it was only gained throu h its expen e or destruct on Thus the miser is shown to us as one who has tran ferred to the gold by wh ch he may buy the goods of this life all the emotions which the goods themselves would yield and who thereafter loves the gold for its own sake p eferring the means of plea ure to the pleasure itself There can be little doubt that much of this analysis a broader view of the facts would have dis-

[1] I lat ly saw bo f fi e (h had bee t ld th t ry f Hect d A hilles) teach ing his y unge br the ed thre h w t play Hect whil h himself sh ld play Achilles, and chase him und th w ll f T t

escarch Bost school boys, by Miss Wiltse f m which t ppears that nly som cc unt of a nineteen t f t hundred and t enty nine had made no ollections.

pelled The miser ' is an abstraction There are all kinds of misers The common sort, the excessively niggardly man simply exhibits the psychological law that the potential has often a far greater influ n r our mind than the actual A man will not m an end to his indefinite

er He will not use open

because the day may come when he will have to

he furnace or dress in a worn out coat and then where will he be? For him better the actual evil than the fear of it and so it is with the common lot of misers Better to live poor now with the *power* of living rich, than to live rich at the risk of losing the power These men value their gold not for its own sake, but for its powers Demonetize it and see how quickly they will get rid of it! The associationist theory is as regards them entirely at fault they care nothing for the gold *in se*

With other misers there combines itself with h r the act the far mo

e as

ound the out id d with symmetry so s mass was the nest

hemp-packing Interlaced with the spikes were ng about two dozen knives forks and spoons all the butcher s knives three in number a large carving knife fork and steel several large plugs of tobacco an old purse containing some silver matches and tobacco nearly all the small tools from the tool closets with several large augers all of which must have been transported some distance as they were originally stored in different parts of the house The outside casing of a silver watch was disposed of in one part of the pile the glass of the same watch in anoth nother[1]

elf in an

eq spend all their time picking pins from the and hoarding them Others collect bits of thread buttons or rags and prize them exceedingly Now the miser *par excellence* of the popular imagination and of melodrama the monster of squalor and misanthropy is simply one of these mentally deranged persons His intell ct clear but his instinct

money but

es Lately in a Massachusetts town there miser who principally hoarded newspapers These had ended by so filling all the rooms of his good sized house from floor to ceiling that his living space was restricted to a few narrow channels between them Even as I write the morning paper gives an account of the emptying of a miser s den in Boston by the City Board of Health What the owner hoarded is thus described

[1] Quoted in Lindsay *Mind in Lower Animals* vol. II p 151

city dump. The empty barrels were filled, shelves were filled, every hole and c rner was filled, and in order t make more storage-room, the hermit co ered his store-room with a network of ropes and hung the ropes as full as they could hold of his curious collections. There was nothing on could think of that wasn t in that room. As a wood-sawyer the old man had never thrown away a saw-blade or a wood buck. The bucks were rheumatic and couldn t stand up and the saw blades were worn down to almost nothing in the middle. Some had been actually worn in two but the ends were carefully sa ed and tored wa As a coal hea er th old man had never cast off a w rn-out basket, and there were dozens of the remains of the old things, patched p with canvas and rope-yarns, in the store-room. There were at least two dozen old hats, fur cloth, silk, and traw etc.

Of course there may be a great many "associations of ideas in the miser's mind about the things he hoards He is a thinking being and must associate things but without an entirely blind impulse in this direction behind all his ideas, such practical results could never be reached

Kleptomania as it is called is an uncontrollable impulse to appropriate, occurrin in persons whose associations of ideas would naturally all be of a counteracting sort Kleptomaniacs often promptly restore or permit to be restored what they have taken so the impulse need not be to keep but only to take But elsewhere hoarding complicates the result. A gentleman with whose case I am acquainted was discovered after his death to have a hoard in his barn of all sorts of articles mainly of a trumpery sort, but including pieces of silver which he had stolen from his own dining room and utensils which he had stolen from his own kitchen and for which he had afterward bought substitutes with his own money

Constructiveness is as genuine and irresistible an instinct in man as in the bee or the beaver Whatever things are plastic to his hands, those things he must remodel into shapes of his own and the result of the remodelling, however useless it may be gives him more pleasure than the original thin The mania of young children for breaking and pullin apart whatever is given them is more often the express on of a rudim ntary constructi e impulse than of a destructive one. Blocks are the playthings of which they are least apt to tire. Clothes weapons, tools hab tations, and works of art are the result of the discoveries to which the plastic instinct leads each individual starting where his forerunners left off and tradition preserving all that once is gained. Clothing where not necessitated by cold is nothing but a sort of attempt to remodel the human body itself —an attempt still better shown in the various tattooings, tooth filings scarrings and other mutilations that are practised by savage tribes As for hab tation there can be no doubt that the instinct to seek a sheltered nook open only on one side into which he may retire and be safe is in man quite as specific as the instinct of birds to build a nest. It is not necessarily in the shape of a shelter from wet and cold that the need comes before him but he feels less ex osed and

[1] *Cf* Fbat, in *Mind* vol. 1 pp. 330-33 ully *ibid* p. 567 M st people probably have the impulse to keep ha I useless finery old tools, pieces f once useful apparatus, etc. but it is normally either inhibited at the tset by reflection, if yielded to, the bjects soo gr w displeasing and are thrown w y

more at home when not altogether uninclosed than when lying all abroad Of course the utilitarian origin of this instinct is obvious But to stick to bare facts at present and not to trace origins we must admit that this instinct now exists and probably always has existed since man was man Habits of the most complicated kind are reared upon it But even in the midst of these habits we see the blind instinct cropping out as for example in the fact that we feign a shelter within a shelter by backing up beds in rooms with their heads against the wall and never lying in them the other way—just as dogs prefer to get under or upon some piece of furniture to sleep instead of lying in the middle of the room The first habitations were caves and leafy grottoes bettered by the hands and we see children to day when playing in wild places take the greatest delight in discovering and appropriating such retreats and playing house there

Play The impulse to play in special ways is certainly instinctive A boy can no more help running after another boy who runs provokingly near him than a kitten can help running after a rolling ball A child trying to get into its own hand some object which it sees another child pick up and the latter trying to get away with the prize are just as much slaves of an automatic prompting as are two chickens or fishes of which one has taken a big morsel into its mouth and decamps with it while the other darts after in pursuit All simple active games are attempts to gain the excitement yielded by certain primitive instincts through feigning that the occasions for their exercise are there They involve imitation hunting fighting rivalry acquisitiveness and construction combined in various ways their special rules are habits discovered by accident selected by intelligence and propagated by tradition but unless they were founded in automatic impulses games would lose most of their zest The sexes differ somewhat in their play impulses As Schneider says

> The little boy imitates soldiers models clay into an oven builds houses makes a wagon out of chairs rides on horseback upon a stick drives nails with the hammer harnesses his brethren and comrades together and plays the stage driver or lets himself be captured as a wild horse by some one else The girl on the contrary plays with her doll washes and dresses it strokes it claps and kisses it puts it to bed and tucks it in sings it a cradle song or speaks with it as if it were a living being This fact that a sexual difference exists in the play impulse that a boy gets more pleasure from a horse and rider and a soldier than from a doll while with the girl the opposite is the case is proof that an hereditary connection exists between the perception of certain things (horse doll etc) and the feeling of pleasure as well as between this latter and the impulse to play [1]

There is another sort of human play into which higher æsthetic feelings enter I refer to that love of festivities ceremonies ordeals etc which seems to be universal in our species The lowest savages have their dances more or less formally conducted The various religions have their solemn rites and exercises and civic and military power symbolize their grandeur by processions and celebrations of divers sorts We have our operas and parties and masquerades An element common to all these ceremonial games as they may be called is the excitement of concerted action as one of an organized crowd The same acts performed with a crowd seem to mean vastly more than when performed alone A

[1] *Der Menschliche Wille* p 205

walk with the people on a holiday afternoon an excursion to drink beer or cof fee at a popular resort or an ordinary ball room are examples of this Not only are we amused at seeing so many strangers but there is a distinct stimula tion at feeling our share in their collective life The perception of them is the timulus and our reaction upon it is our tendency to join them and do what they are doing and our unwillingness to be the first to leave off and go home alone This seems a primitive element in our nature as it is difficult to trace any association of ideas that could lead up to it although once granting it to exist it is very easy to see what its uses to a tribe might be in facilitating prompt and

tion The formation of armies and the undertaking of mil

habit and continued by trad tion The co-operation of other æsthetic pleasures with games ceremonial or other has a great deal to do with the selection of h as shall become stereotyped and habitual The peculiar form of excitement

Curios ty Already pretty low down among vertebrates we find that any object may excite attent on provided it be only *novel* and that attention may be followed by approach and exploration by nostril l ps or touch Curiosity and fear form a couple of antagonistic emotions liable to be awakened by the same utward thing and manifestly both are useful to their possessor The pectacle of their alternation is often amusing enough as in the timid approaches and scared wheelings which sheep or cattle will make in the presence of some new object they are invest gating I have seen all gators in the water act in precisely the same way towards a man seated on the beach in front of them—gradually draw ng near as long as he kept still frantically careering back as soon as he made a mo ement. Inasmuch as new objects *may* always be advantageous it is better that an animal should not *absolutely* fear them But inasmuch as they may also possibly be harmful it is better that he should not be quite indifferent to them e ther but on the whole remaining on the *qui vive* ascertain as much about them and what they may be likely to bring forth as he can before settling down

that the original root may be hard to find W th what is called scientific curios ty and with metaphysical wonder the practical instinctive root has probably nothing to do The stimuli here are not objects but ways of conceivin objects

Pr fesso Lazarus (*Die Rei des Spiele* [Berlin, 883] p 44) denies th t we ha an in inct t play and says th oot f the matter is th st t ... *expued* which substit tes sham occupati when real is dy N d bt this is tru b t why th particula f rms f sh m occupati ? Th l m f all bodily games d f er monial g mes gi en by direct excito-m t stim lations—just as wh p ppies chase on an th and allo ha parliam t

and the emotions and actions they give rise to are to be classed with many other æsthetic manifestations sensitive and motor as *incidental* features of our mental life The philosophic brain responds to an inconsistency or a gap in its knowledge just as the musical brain re ponds to a discord in what it hears At certain ages the sensitiveness to particular gaps and the pleasure of resolving particular puzzles reach their maximum and then it is that stores of scientific knowledge are easiest and most naturally laid in But these effects may have had nothing to do with the uses for which the brain was originally given and it is probably only within a few centuries since religious beliefs and economic applications of science have played a prominent part in the conflicts of one race with another that they may have helped to select for survival a particular type of brain I shall have to consider this matter of incidental and supernumerary faculties in Chapter XXVIII

Sociability and Shyness As a gregarious animal man is excited both by the absence and by the presence of his kind To be alone is one of the greatest of evils for him Solitary confinement is by many regarded as a mode of torture too cruel and unnatural for civilized countries to adopt To one long pent up on a desert island the sight of a human footprint or a human form in the distance would be the most tumultuously exciting of experiences In morbid states of mind one of the commonest symptoms is the fear of being alone This fear may be assuaged by the presence of a little child or even of a baby In a case of hydrophobia known to the writer the patient insisted on keeping his room *crowded* with neighbors all the while so intense was his fear of solitude In a gregarious animal the perception that he is alone excites him to vigorous activity Mr Galton thus describes the behavior of the South African cattle whom he had such good opportunities for observing

> Although the ox has little affection for or interest in his fellows he cannot endure even a momentary separation from his herd If he be separated from it by stratagem or force he exhibits every sign of mental agony he strives with all his might to get back again and when he succeeds he plunges into its middle to bathe his whole body with the comfort of closest companionship [1]

Man is also excited by the presence of his kind The *bi arre* actions of dogs meeting strange dogs are not altogether without a parallel in our own constitution We cannot meet strangers without a certain tension or talk to them exactly as to our familiars This is particularly the case if the stranger be an important personage It may then happen that we not only shrink from meeting his eye but actually cannot collect our wits or do ourselves any sort of justice in his presence

> This odd state of mind [says Darwin[2]] is chiefly recognized by the face reddening by the eyes being averted or cast down and by awkward nervous movements of the body Shyness seems to depend on sensitiveness to the opinion whether good or bad of otl[illegible] ally with respect to external appearance Strangers neither know nor [illegible]
> criticise o[illegible]
> the dress [illegible]

[1] *Inquiries i to Human Faculty* p 72

[2] *Expression of the Emotio s* (New York 1873) p 330

mal s the shy intolerably shy which are likely to attract the attentio of st On the other hand in those cases in which co cerned we are much more apt to be sh judgment we in some degree al e than in o ever are so sens tive that the mere ct of sp rouse their self consc ousness and a slight c h ness and blushing much more easily e of those with whom they a e

st angers
in battle
Almost
mo t men emain so

As Mr Darwin observes a real dread of definite consequences may enter into this stage-fright and complicate the shyness Even so our shyness before an important p d h what Professor Bain calls servile terror ba. stage-fright of danger We must and constraint due to the consciousness that we have become people s eyes Mr Darwin goes on to say Shyness comes on at a very early age In one of my own children two years and three months old I saw a trace of what certainly appeared to be shyness di ected toward myself after an absence f f 1 week F ery parent has noticed the same sort of thing

ever have
seem ca
drances
h gh places and certain squeamishnesses emotions in pite of which we get along But they seem to play an important part n the production of two other propensities about the instinctive character of wh ch a good deal of contro ersy has prevailed I refer to cleanliness and modesty to which we must proceed but not before we have said a word about another impulse closely allied to shyness I mean—

instincts Its natural stimuli are unfamiliar human beings especially those whom we re pect Its reactions are the arrest of whatever we are saying or do ng when

"The certainty that ar well dressed, charming w ma has said gi us pea e of he rt compared to which that y elded by th cons lat ns f eligi is as nothing

such strangers draw nigh coupled often with the pretense that we were not say ing or doing that thing but possibly something different Often there is added to this a disposition to mendacity when asked to give an account of ourselves With many persons the first impulse when the door bell rings or a visitor is suddenly announced, is to scuttle out of the room so as not to be caught' When a per son at whom we have been looking becomes aware of us our immediate impulse may be to look the other way and pretend we have not seen him Many friends have confessed to me that this is a frequent phenomenon with them in meeting acquaintances in the street especially unfamiliar ones The bow is a secondary correction of the primary feint that we do not see the other person Probably most readers will recognize in themselves at least the *start* the nascent disposition on many occasions to act in each and all of these several ways That the start is neutralized by second thought proves it to come from a deeper region than thought There is unquestionably a native impulse in every one to conceal love affairs and the acquired impulse to conceal pecuniary affairs seems in many to be almost equally strong It is to be noted that even where a given habit of concealment is reflective and deliberate its motive is far less often definite prudence than a vague aversion to have one s sanctity invaded and one s per sonal concerns fingered and turned over by other people Thus some persons will never leave anything with their name written on it where others may pick it up—even in the woods an old envelope must not be thrown on the ground Mai
ter
no a
by superiors than by equals or inferiors How differently do boys talk together when their parents are not by! Servants see more of their masters characters than masters of servants [1] Where we conceal from our equals and familiars there is probably always a definite element of prudential prevision involved *Collective* secrecy mystery enters into the emotional interest of many games and is one of the elements of the importance men attach to freemasonries of various sorts being delightful apart from any end

Cleanliness Seeing how very filthy savages and exceptional individuals among civilized people may be philosophers have doubted whether any genuine instinct of cleanliness exists and whether education and habit be not respon sible for whatever amount of it is found Were it an instinct its stimulus would be dirt and its characteristic reaction the shrinking from contact therewith and the cleaning of it away after contact had occurred Now if some animals are

with Admiral Nelson K C B ? There are secr ts pre ar cat ons fibs if you will between Tom and the adm ral—bet en your crew (of servants) a d *the* captain I know I h e a worthy clean agreeable a d consc entious male or fem le hypocrite at so many guin s a year to do so and so for me Were he other than hypocrite I would send him about his business

cleanly men *may* be so and there can be no doubt that some kinds of matter *are* natively repugnant both to si ht touch and smell—excrementitious and pu trid things blood pus entrails and diseased tissues for example It is true that the shrinking from contact with these thin s may be inhibited very easily as by a med cal education and it is equally true that the impulse to clean them away may be inhibited by so slight an obstacle as the thought of the coldness of the ablution or the necessity of getting up to perform it It is also true that an im pulse to cleanliness habitually checked will become obsolete fast enou h But none of these facts prove the impulse never to have been there It seems to be there in all cases and then to be particularly amenable to outside influences the child having his own degree of squeamishness about what he shall touch or e h ha dened or made more fastidious still by the habits h

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ing classed and so we wash up and set ourselves ri nt at mon ents u social self consciousness is awakened in a manner toward which no strictly in stincti e native prompting exists But the standard of cleanl ness attained in this way is not likely to go beyond the mutual tolerance for one another of the members of the tribe and hence may comport a good deal of actual filth

Modesty Shame Whether there be an instinct ve impulse to hide certain parts of the body and certain acts is perhaps even more open to doubt than whether there be an instinct of cleanliness Anthropologists have denied it and in the utter shamelessness of infancy and of many savage tribes have seemed to f nd a good basis for the r views It must however be remembered that nfancy pr es nothing and that as far as sexual modesty goes the sexual impulse itself works d rectly against t at times of excitement and with reference to certain people and that habits of immodesty contracted with those people *may forever* afterwards inhib t in it any impulse to be modest towards *them* This would ac count for a great deal of actual immodesty even if an or g nal modest impulse were there On the other hand the modest impulse if it does exist must be ad mitted to have a singularly ill-defined phere of influence both as regards the presences that call it forth and as regards the acts to which it leads Ethnology hows t to have very little backbone of its own and to follow easily fashion and example Still it is hard to see the ubiquity of some sort of tribute to shame h wever perverted—as where female modesty consists in covering the face alone or immodesty in appearing before stran e s unpa nted—and to bel eve it

Th in ane ymp m call d mysoph bia d d f f l ss which leads a pati t t wash his hands pe haps h d d t m s day hardly seems plicabl w th t pposing p m u imp lse t cl self f hich t is as t th) gg rati

to have no impulsive root whatever. Now what may the impulsive root be? I believe that, for one thing, it is shyness, the feeling of dread that unfamiliar persons, as explained above, may inspire us withal. Such persons are the original stimuli to our modesty.[1]

But the actions of modesty are quite different from the actions of shyness. They consist of the restraint of certain bodily functions, and of the covering of certain parts; and why do such particular actions necessarily ensue? That there *may* be in the human animal, as such, a 'blind' and immediate automatic impulse to such restraints and coverings in respect inspiring presences is a possibility difficult of actual disproof. But it seems more likely, from the facts, that the actions of modesty are suggested to us in a roundabout way, and that, even more than those of cleanliness, they arise from the application in the second instance to ourselves of judgments primarily passed upon our mates. It is not easy to believe that, even among the nakedest savages, an unusual degree of cynicism and indecency in an individual should not beget a certain degree of contempt, and cheapen him in his neighbor's eyes. Human nature is sufficiently homogeneous for us to be sure that everywhere reserve must inspire some respect, and that persons who suffer every liberty are persons whom others disregard. Not to be like such people, then, would be one of the first resolutions suggested by social self-consciousness to a child of nature just emerging from the unreflective state. And the resolution would probably acquire effective pungency for the first time when the social self-consciousness was sharpened into a real fit of shyness by some person being present whom it was important not to disgust or displease. Public opinion would of course go on to build its positive precepts upon this germ; and, through a variety of examples and experiences, the ritual of modesty would grow, until it reached the New England pitch of sensitiveness and range, making us say stomach instead of belly, limb instead of leg, retire instead of go to bed, and forbidding us to call a female dog by name.

At bottom this amounts to the admission that, though in some shape or other a natural and inevitable feature of human life, modesty need not necessarily be an instinct in the pure and simple excito-motor sense of the term.

Love. Of all propensities, the sexual impulses bear on their face the most obvious signs of being instinctive, in the sense of blind, automatic, and untaught. The teleology they contain is often at variance with the wishes of the individuals concerned; and the actions are performed for no assignable reason but because Nature urges just that way. Here, if ever, then, we ought to find those characters of fatality, infallibility, and uniformity which we are told make of actions done from instinct a class so utterly apart. But is this so? The facts are just the reverse: the sexual instinct is particularly liable to be checked and modified by slight differences in the individual stimulus, by the inward condition of the agent himself, by habits once acquired, and by the antagonism of contrary impulses operating on the mind. One of these is the ordinary shyness recently

[1] We often find modesty coming in only in the presence of foreigners, especially of clothed Europeans. Only before these do the Indian women in Brazil cover themselves with their girdle; only before these do the women in Timor conceal the bosom. In Australia we find the same thing happening. (Th. Waitz, *Anthrop. der Naturvölker*, vol. 1, p. 358.) The author gives bibliographical references which I omit.

described another is what might be called the *anti sexual instinct* the instinct of personal isolation the actual repulsiveness to us of the idea of intimate con

never find an occasion to have it gratified There could be no better proof of the truth of that proposition with which we began our study of the instinctive life in man that irregularity of behavior may come as well from the possession of too many instincts as from the lack of any at all

The instinct of personal isolation of which we have spoken exists more stron ly in men with respect to one another and more strongly in women with respect to men In women it is called coyness and has to be positively overcome by a process of wooing before the sexual instinct inhibits it and takes its place As Darwin has shown in his book on *The Descent of Man and Sexual Selection*

habits—for once broken through with a given person it is not apt to assert it self again and habitually broken through as by prostitutes with various per sons it may alto ether decay Habit also fixes it in us toward certain individ uals nothing is so particularly di pleas ng as the notion of close personal con tact with those whom we have long known in a respectful and distant way The

pposc tuat tue ancients had by gift of Nature a propensity of which we are devoid and were all vict ms of what is now a pathological aberration limited to individuals It is more probable that with them the instinct of physical aversion toward a certain class of objects was inh bited early in life by *habits* formed under the influence of *example* and that then a kind of sexual appetite of which very likely most men possess the germinal possibility developed ‿elf in an unrestricted way That the development of it in an abnormal way may check its development in the normal way seems to be a well ascerta ned medical fact And that the direc tion of the sexual instinct towards one individual tends to inhibit its application to other individuals is a law upon which though it suffers many exceptions the whole *rég me* of monogamy is based These details are a little unpleasant to discuss but they show so beautifully the correctness of the general principles in the l ght of which our review has been made that it was impossible to pass them o er unremarked

Jealousy is unquestionably instinctive.

Pa ental Love is an instinct stronger in woman than in man at least in the early childhood of its object I need do little more than quote Schne der s lively descr ption of it as it exists in her

T most f us t is even pleasant to sit d n in chair till warm f m occupancy by noth perso body T many hand shak g is disa ree ble

As soon as a wife becomes a mother her whole thou ht a d feeling her whole being
being of the satisfaction
everything that went on
ice to herself she asked
y her the requisite attention and as far as possible fulfil her wishes Now however the centre of the world is no longer herself but her child She does not think of her own hunger she must fir t be sure that the child is fed It is nothing to her that she herself is tired and needs rest so long as she sees that the child s sleep is disturbed the moment it stirs she awakes though far stronger noises fail to arouse her now She who formerly could not bear the slightest carelessness of dress and touched everything with gloves allows herself to be soiled by the infant and does not shrink from seizing its clouts with her naked hands Now she has the greatest patience with the ugly piping cry baby (*Schreihals*) whereas until now every discordant sound every slightly unpleasant noise made her nervous Every limb of the still hideous little being appears to her beautiful every movement fills her with delight She has in one word transferred her entire egoism to the child and lives only in it Thus at least it is in all unspoiled naturally bred mothers who alas! seem to be growing rarer and thus it is with all the higher animal mothers The maternal joys of a cat for example are not to be disgui ed With an expression of infinite comfort she stretches out her fore legs to offer her teats to her children and moves her tail with delight when the little hungry mouths tug and suck But not only the contact the bare look of the offspring affords endless delight not only because the mother thinks that the child will some day grow great and handsome and bring her many joys but because she has received from Nature an instinctive love for her children She does not herself know why she is so happy and why the look of the child and the care of it are so agreeable any more than the young man can give an account of why he loves a maiden and is so happy when she is near Few mothers in caring for their child think of the proper purpose of maternal love for the preservation of the species Such a thought may arise in the father s mind seldom in that of the mother The latter feels only that it is an everlasting delight to hold the being which she has brought forth protectingly in her arms to dress it to wash it to rock it to sleep or to still its hunger

So far the worthy Schneider to whose words may be added this remark that the passionate devotion of a mother—ill herself perhaps—to a sick or dying

These are the most prominent of the tendencies which are worthy of being called instinctive in the human species[1] It will be observed that *no other mam*

[1] Some will of course find the list too large others too small With the boundaries of nstinct fading into reflex act on below nd into acq ed hab t or sugg sted activity bove it is likely that there w ll always be cont oversy about ju t what to includ under the class name Shall we add the p opensity to walk long a curbsto e or any ther narrow path to the list of insti cts? Shall we subtr ct secret ve ess s due to shyness or to fear? Who knows?
b
questions
it matters
The phrenolog sts add adhes ve s inhabiti ess love f approbation etc etc to their list of sentime ts wh ch n the ma n agree w th our list of instincts Fortlage in his *System der Psychologie* cl sses among the *Tri be* all the vegetative physiological fu ctions S ntlus (*Zur Psycholog e d r menschl chen Triebe* Le pzig 1864) says the e re at bottom

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by in a sort of starvation of objects and the

in his psychic constitution which future experiences can never fill Compare the accompl shed gentleman with the poor artisan or tradesman of a city during the adolescence of the former objects appropriate to his growing interests bod

il and mental were offered as fast as the interests awoke and as a conse

c le to meet the world Sport came

no desires
anomalies
unnatural bringing up

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b t thr e instin
f Bri g he su
mb aci g th
F tl be
[illegible]

As soon as a wife becomes a mother her whole thought and feeling her whole being is altered Until then she had only thought of her own well being of the satisfaction of her vanity the whole world appeared made only for her everything that went on about her was only noticed so far as it had personal reference to herself she asked of every one that he should appear interested in her pay her the requisite attention and as far as possible fulfil her wishes Now however the centre of the world is no longer herself but her child She does not think of her own hunger she must first be sure that the child is fed It is nothing to her that she herself is tired and needs rest so long as she sees that the child s sleep is disturbed the moment it stirs she awakes, though far stronger noises fail to arouse her now She who formerly could not bear the slightest carelessness of dress and touched everything with gloves allows her elf to be soiled by the infant and does not shrink from seizing its clouts with her naked hands Now she has the greatest patience with the ugly piping cry baby (*Schreihals*) whereas until now every discordant sound every slightly unpleasant noise made her nervous Every limb of the still hideous little being appears to her beautiful every movement fills her with delight She has in one word transferred her entire egoism to the child and lives only in it Thus at least it is in all unspoiled naturally bred mothers who alas! seem to be growing rarer and thus it is with all the higher animal mothers The maternal joys of a cat for example are not to be di gui ed With an expression of infinite comfort she stretches out her fore legs to offer her teats to her children and moves her tail with delight when the little hungry mouths tug and suck But not only the contact the bare look of the offspring afford endless delight not only because the mother thinks that the child will some day grow great and handsome and bring her many joys but because she has received from Nature an instinctive love for her children She does not herself know why she is so happy and why the look of the child and the care of it are so agreeable any more than the young man can give an account of why he loves a maiden and is so happy when she is near Few mothers in caring for their child think of the proper purpose of maternal love for the preservation of the species Such a thought may arise in the father s mind seldom in that of the mother The latter feels only that it is an everlasting delight to hold the being which she has brought forth protectingly in her arms to dress it to wash it to rock it to sleep or to still its hunger

So far the worthy Schneider to whose words may be added this remark that the passionate devotion of a mother—ill herself perhaps—to a sick or dying child is perhaps the most simply beautiful moral spectacle that human life affords Contemning every danger triumphing over every difficulty outlasting all fatigue woman s love is here invincibly superior to anything that man can show

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[1] Some w ll of course find the list t o large, others too small With the boundaries of insti ct fading into reflex action b low nd into acquir d habit or suggest d acti ity ab ve it is likely that there will always be co tr ersy about just what to include under the class name Shall ve add the p opensity to w lk along a cu bstone or any other narr w path to the list of in tincts? Shall we subtract secret veness as due to shyness or to fea ? Who knows? M anwh le our physiological method has th i est mable d antage that such questions of lim t have neither theoretical no practical importance The facts once noted

tem der Psycl olog e classes among the *Tr be* all the vegetative phys logical functions Santlus (*Zu Psycholog e der menschl ch n Trieb* Leip g 1864) says there are at bottom

and not even the monkey shows so large an array. In a perfectly rounded development, every one of these instincts would start a habit toward certain objects and inhibit a habit toward certain others. Usually this is the case; but, in the one-sided development of civilized life, it happens that the timely age goes by in a sort of starvation of objects, and the individual then grows up with gaps in his psychic constitution which future experiences can never fill. Compare the

quence he is armed and equipped at every angle to meet the world. Sport came to the rescue and completed his education where real things were lacking. He has tasted of the essence of every side of human life, being sailor, hunter, athlete, scholar, fighter, talker, dandy, man of affairs, etc., all in one. Over the city poor boy's youth no such golden opportunities were hung, and in his manhood no desires for most of them exist. Fortunate it is for him if gaps are the only anomalies his instinctive life presents; perversions are too often the fruit of his unnatural bringing-up.

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but three instincts, that of Being, that of Function, and that of Life. The Instinct of Being he subdivides into *animal*, embracing the activities of all the senses, and *psychical*, embracing the acts of the intellect and of the "transempiric consciousness." The Instinct of Function he divides into *sexual*, *educational* (friendship, attachment, honor), and *moral* (religion, philanthropy, faith, truth, moral freedom, etc.). The Instinct of Life embraces *assertion* (nutrition, motion), *sociality* (imitation, juridical and social arrangements), and *personal interest* (love of independence and freedom, acquisitiveness, self-defence). Such a muddled list as this shows how great are the advantages of the physiological analysis we have used.

Chapter XXV

THE EMOTIONS

In speaking of the instincts it has been impossible to keep them separate from the emotional excitements which go with them Objects of rage, love fear, etc not only prompt a man to outward deeds but provoke characteristic alterations in his attitude and visage and affect his breathing circulation and other organic functions in specific ways When the outward deeds are inhibited these latter emotional expressions still remain and we read the anger in the face though the blow may not be struck and the fear betrays itself in voice and color though one may suppress all other sign *Instinctive reactions and emotional expressions thus shade imperceptibly into each other Every object that excites an instinct excites an emotion as well* Emotions however fall short of instincts in that the emotional reaction usually terminates in the subject s own body whilst the instinctive reaction is apt to go farther and enter into practical relations with the exciting object

Emotional reactions are often excited by objects with which we have no practical dealings A ludicrous object, for example or a beautiful object are not necessarily objects to which we *do* anything we simply laugh or stand in admiration as the case may be The class of emotional is thus rather larger than that of instinctive impulses commonly so called Its stimuli are more numerous, and its expressions are more internal and delicate and often less practical The physiological plan and essence of the two classes of impulse however is the same

As with instincts so with emotions the mere memory or imagination of the object may suffice to liberate the excitement One may get angrier in thinking over one s insult than at the moment of receiving it and we melt more over a mother who is dead than we ever did when she was living In the rest of the chapter I shall use the word *object* of emotion indifferently to mean one which

A few examples of their variety however ought to find a place here Let me begin with the manifestations of Grief as a Danish physiologist C Lange describes them [1]

The chief feature in the physiognomy of grief is perhaps its paralyzing effect on the voluntary movements This effect is by no means as extreme as that which fright produces being seldom more than that degree of weakening which makes it cost an effort to perform actions usually done with ease It is in other words a feeling of [illegible] ess and (as in all weariness) *movements are made slowly heavily* without

[1] *Uber Gem thsbewegu gen* tr by H Ku lla (Le pz g 1887)

of the feeble activity of the muscles of expiration and of the larynx. He prefers to sit still, sunk in himself and silent. The tonicity or 'latent innervation' of the muscles is strikingly diminished. The neck is bent, the head hangs ('bowed down' with grief); the relaxation of the cheek- and jaw-muscles makes the face look long and narrow; the jaw may even hang open. The eyes appear large, as is always the case where the *orbicularis* muscle is paralyzed, but they may often be partly covered by the upper lid which droops in consequence of the laming of its own *levator*. With this condition of weakness of the voluntary nerve- and muscle-apparatus of the whole body, there coexists, as aforesaid, just as in all states of similar motor weakness, a subjective feeling of weariness and heaviness, of something which weighs upon one; one feels 'downcast,' 'oppressed,' "laden," one speaks of his "weight of sorrow," one must 'bear up' under it, just as one must 'keep down' his anger. Many there are who 'succumb' to sorrow to such a degree that they literally cannot stand upright, but sink or lean against surrounding objects, fall on their knees, or, like Romeo in the monk's cell, throw themselves upon the earth in their despair.

But this weakness of the entire voluntary motor apparatus (the so-called apparatus of 'animal' life) is only one side of the physiology of grief. Another side, hardly less important, and in its consequences perhaps even more so, belongs to another subdivision of the motor apparatus, namely the involuntary or 'organic' muscles, especially those which are found in the walls of the blood-vessels, and the use of which is, by contracting, to diminish the latter's calibre. These muscles and their nerves, forming together the "vaso-motor apparatus," act in grief contrarily to the voluntary motor apparatus. Instead of being paralyzed, like the latter, the vascular muscles are more strongly contracted than usual, so that the tissues and organs of the body become anæmic. The immediate consequence of this bloodlessness is pallor and shrunkenness, and the pale color and collapsed features are the peculiarities which, in connection with the relaxation of the visage, give to the victim of grief his characteristic physiognomy, and often give an impression of emaciation which ensues too rapidly to be possibly due to real disturbance of nutrition, or waste uncompensated by repair. Another regular consequence of the bloodlessness *of the skin is a feeling of cold, and shivering.* A constant symptom of grief is sensitiveness to cold, and difficulty in keeping warm. In grief the inner organs are unquestionably anæmic as well as the skin. This is of course not obvious to the eye, but many phenomena prove it. Such is the diminution

[illegible]

arise from this.] In nursing women the milk diminishes or altogether dries up. There is one of the most regular manifestations of grief which apparently contradicts these other physiological phenomena, and that is the weeping, with its profuse secretion of tears, its swollen reddened face, red eyes, and augmented secretion from the nasal mucous membrane.

Lange goes on to suggest that this may be a *reaction* from a previously contracted vaso-motor state. The explanation seems a forced one. The fact is that there are changeable expressions of *grief.* The weeping is as apt as not to be immediate, especially *in* women and children. Some men can never weep. The tearful and the dry phases alternate in all who can weep, sobbing storms being followed by periods of calm; and the shrunken, cold, and pale condition which Lange describes so well is more characteristic of a severe settled sorrow than of an acute mental pain. Properly we have two distinct emotions here, both prompted by the same object, it is true, but affecting different persons, or the same person at different times, and *feeling* quite differently whilst they last, as

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[1] *Uber Gem thsbeweg g n* tr by H Kurella (Le p g 1887)

Fear is often preceded by astonishme t and is so far akin to it that both lead to

observation. The heart beats quickly a d violently so that it palpitates or knocks against the ribs but t is ery doubtful if it then wo ks more efficiently than usual, so as to send a greater supply of blood to all parts of the body for the skin instantly becomes pale as during inc p t faintness This pale ess of the su face however is p obably in large part or is excl ely due to the so motor centre being affected in such a manner as t cause the contracti of the small arteries of th skin That the skin s much ffected u der the ense of g eat fear we see in the marvellous manner in which per p t o immediately exudes from it This exudation is all the more rema kable as the surf ce th c ld and hence the term a c ld weat whereas the sud rific glands are properly excited into action when the surface is heated The h rs also o the skin stand erect and the uperfic al muscles shi er In connection w th the disturbed action of the heart the b eathing is hur ed. The sal ary glands act imperfectly the mouth becomes dry and is often opened and shut. I ha e also otic d that der sl ght fear there is a strong tendency to yawn O e f the best marked symptoms s the trembli g of ll the muscles of the body and this is often first seen the lip F m this cause and f om the dryness f the mouth the vo ce bec mes hu ky or i distinct or may altogether fail *Obst pui stet tque comæ et vo fau bus hæsit* As fear inc eases into an agony of terror we behold as und ll violent emot ons d rsified e ults The heart beats wildly or must fail to act and faintness ensue the e is a death like pallor the b eathi g is l bored the f

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que p err t The pupils are said to be en rmously dilated. All the muscles of the body may b c me rigid m

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y be zed i th a sudden panic

Finally take Hatred and read the synopsis of its possible effects as given by Sig Mantegazza

W thd a al f the head backwards withd w t f proje tion forwa ds ont action or cl su e these a e all elemen as inte se frown ing ey w de pen display f l th m ding teeth and contracting jaws pened s threatening actio of arms tamping growli g and various cries aut matic en weakness and trembli g of vo c p tting Finally n us misc llaneous eactio s and a o-motor sympt ms gen ral trem bling c n ul ns f l ps nd f cial m cles of limbs and of trunk cts f i lence to o es self as b t g fist or nails sardonic laught r bright redness of face sudden pall r of face extrem dilatat on of nostrils standing up of hair on head.

[1] Darwin Th O [illegible] f the Emotions pp 90–9

La Phy m t l' press de iment (Paris, 885) p 40.

anyone s consciousness will testify There is an excitement during the crying fit which is not without a certain pungent pleasure of its own but it would take a genius for felicity to discover any dash of redeeming quality in the feeling of dry and shrunken sorrow —Our author continues

If the smaller vessels of the lungs contract so that these organs become anæmic, we have (as is usual under such conditions) the feeling of insufficient breath and of oppression of the chest and these tormenting sensations increase the sufferings of the griever who seeks relief by long drawn sighs instinctively like every one who lacks breath from whatever cause [1]

The anæmia of the brain in grief is shown by intellectual inertia dullness a feeling of mental weariness effort and indisposition to work often by sleeplessness. Indeed it is the anæmia of the motor centres of the brain which lies at the bottom of all that weakening of the voluntary powers of motion which we described in the first instance.

My impression is that Dr Lange simplifies and universalizes the phenomena a little too much in this description and in particular that he very likely over does the anæmia business But such as it is his account may stand as a favor able specimen of the sort of descriptive work to which the emotions have given rise

Take next another emotion Fear and read what Mr Darwin says of its effects

[1] The bronchial tubes may be contracted as well as the ramificat ons of the pulmonary artery Professor J Henle has amongst his *Anthropolog sche Vortrage* an exquisite one on the Natural History of the Sigh in which he represents our inspirations as the result of a battle between the red muscles of our skeleton r bs and diaphragm and the white ones of the lungs which seek to narrow the calibre of the air tubes In the normal state the former easily conquer but under other conditions they either conquer with difficulty or are defeated The contrasted emotions express themselves in similarly contrasted wise by spasm and paralysis of the unstriped muscles and for the most part alike in all the organs which are provided with them as arter es skin and bronchial tubes The contrast among

expectation anxiety before a public address vexation at an unmerited aff ont etc one finds that the suffering part of it concentrates itself principally in the chest and that it consists in a sore ess hardly to be called pain felt in the middle of the breast and due to an unpleasant

corporeally repugnant feeling of lack of air a slight deg ee of suffocation If on the con trary the outer muscles overcome the resistance of the inner ones the oppressed breast is lightened We th nk we speak symbolically when we speak of a stone weighing on our heart or of a burden rolled from off our b east But really we only express the exact fact for we should have to raise the entire we ght of the atmosphere (about 820 kilog) at each inspira tion if the air did not balance it by streaming into our lungs. (p 55) It must not be forgotten that an inhib tion of the inspir tory centre sim lar to that produc d by exciting the

Nov 7 and 14 1878 and rem rks thereon by James J Put am *ibid* Nov 21

constitution and conditionin which I had already broached the previous year in an article in *Mind* None of the cr ticisms which I ha e heard of it have made me doubt its essential truth I will therefore devote the next few pages to explain what it is I shall limit myself in the first instance to what may be called the *coarser* emotions grief fear ra e love in which every one recognizes a strong organic reverberation and afterwards speak of the *subtler* emotions or of those whose organic reverberation is less obvious and trong

Emotion Follows upon the Bodily Expression in the Coarser Emotions at Least

Our natural way of thinking about these coarser emotions is that the mental perception of some fact excites the mental affection called the emotion and that this latter state of mind gives rise to the bodily expression My theory on the contrary is that *the bodily cha ges follow directly the perception of the excit ng fact and that our feel ng of the same cha ges as they occur is the emotion* Common sense says we lose our fortune are sorry and weep we meet a bear are frightened and run we are insulted by a rival are angry and strike The hypothesis here to be defended says that this order of sequence is incorrect that the one mental tate is not immediately induced by the other that the bodily manifestations mu t first be interposed between and that the more rational stateme t is that we feel sorry because we cry angry because we strike afraid because we tremble and not that we cry strike or tremble because we are sorry angry f ful as the case may be Without the bodily states following n the percep destitute of e run recei e

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T begin with no reader of the last two chapters will be inclined to doubt the fact that *obj cts do exc te bodily cha ges* by a preorganized mechanism or the farther fact that *the cha ges are so ndefi itely n merous and subtle that the e tire orga sm may be call d a so d ng board* which every change of consciousness however l ght may make re erberate The various permutations and com binat ons f wh ch these organic activities are suscept ble make it abstractly poss'ble that no hade of emotion however sl ght should be without a bodily reverberation as unique when taken in its totality as is the mental mood itself The imm nse number of parts modified in each emotion is what makes it so difficult fo us to reprod ce in cold blood the total and integral expression of any one f them We may catch the trick with the voluntary muscles, but fail w th the skin glands, heart and other viscera Just as an artificially imitated sneeze lacks something f the real ty so the attempt to imitate an emotion in the absence f its n rmal nst gat n cause is apt to be rather hollow

The next thi to be n ticed is this that *every one of the bodily changes whatsoever it be is FELT acutely or obscurely the moment it occurs* If the

Were we to go through the whole list of emotions which have been named by men and study their organic manifestations we should but ring the changes on the elements which these three typical cases involve *Rigidity of this muscle relaxation of that* constriction of arteries here dilatation there breathing of this sort or that pulse slowing or quickening this gland secreting and that one dry etc etc We should moreover find that our descriptions had no absolute truth that they only applied to the average man that every one of us almost has some personal idiosyncrasy of expression laughing or sobbing differently from his neighbor or reddening or growing pale where others do not We should find a like variation in the objects which excite emotion in different persons Jokes at which one explodes with laughter nauseate another and seem blasphemous to a third and occasions which overwhelm me with fear or bashfulness are just what give you the full sense of ease and power The internal shadings of emotional feeling moreover merge endlessly into each other Language has discriminated some of them as hatred antipathy animosity dislike aversion malice spite vengefulness abhorrence etc etc *but in the dictionaries of synonyms* we find these feelings distinguished more by their severally appropriate objective stimuli than by their conscious or subjective tone

The result of all this flux is that the merely descriptive literature of the emotions is one of the most tedious parts of psychology And not only is it tedious but you feel that its subdivisions are to a great extent either fictitious or unimportant and that its pretences to accuracy are a sham But unfortunately there is little psychological writing about the emotions which is not merely descriptive *As emotions are described in novels they interest us for we are made to* share them We have grown acquainted with the concrete objects and emergencies which call them forth and any knowing touch of introspection which may grace the page meets with a quick and feeling response Confessedly literary works of aphoristic philosophy also flash lights into our emotional life and give us a fitful delight But as far as scientific psychology of the emotions goes I may have been surfeited by too much reading of classic works on the subject but I should as lief read verbal descriptions of the shapes of the rocks on a New Hampshire farm as toil through them again *They give one nowhere a central* point of view or a deductive or generative principle They distinguish and refine and specify *in infinitum* without ever getting on to another logical level whereas the beauty of all truly scientific work is to get to ever deeper levels Is there no way out from this level of individual description in the case of the emotions? I believe there is a way out but I fear that few will take it

The trouble with the emotions in psychology is that they are regarded too much as absolutely individual things So long as they are set down as so many eternal and sacred psychic *entities like the old immutable species in* natural history so long all that *can* be done with them is reverently to catalogue their separate characters points and effects But if we regard them as products of more general causes (as species are now regarded as products of heredity and variation) the mere distinguishing and cataloguing becomes of subsidiary importance Having the goose which lays the golden eggs the description of each egg already laid is a minor matter Now the general causes of the emotions are indubitably physiological Prof C Lange of Copenhagen in the pamphlet from which I have already quoted published in 1885 a physiological theory of their

be without its tears its sobs its suffocation of the heart its pang in the breast bone? A feelingless cognition that certain circumstances are deplorable and nothing more Every passion in turn tells the same story A purely disembodied human emotion is a nonentity I do not say that it is a contradiction in the na ture of things or that pure spirits are necessarily condemned to cold intellectual lives but I say that for *us* emotion dissociated from all bodily feeling is in concervable The more closely I scrutinize my states the more persuaded I become that whatever moods affections and passions I have are in very truth constituted by and made up of those bodily changes which we ordinarily call their expression o consequence and the more it seems to me that if I were to become corporeally anæsthetic, I should be excluded from the life of the affec tions harsh and tende alike and drag out an existence of merely cognitive or intellectual form. Such an existence although it seems to have been the ideal of ancient sa es is too apathetic to be keenly sought after by those born after the revival of the worship of sensibility a few generations ago

Let not this view be called materialistic. It is ne ther more nor less materialistic than any other view which says that our emotions are conditioned by nerv ous processes. No reader of this book is likely to rebel against such a saying so lo g as it is expressed in general terms and if any one still finds materialism in the thesis now defended that must be because of the pecial processes invoked They are *sensatio al* processes processes due to inward currents set up by physical happenings Such processes have it is true, always been regarded by the platonizers in psychology as having something peculiarl hose about ... atever be ... worthy ... they remain no less deep pure spiritual and worthy of regard on this present sensa tional theory They carry their own inner measure of worth with them and it ... provin, that sen... heir vileness and

If such a theory is true then each emotion is the resultant of a sum of element and each element is caused by a physiological process of a sort already well known. The elements are all organic chan es and each of them is the reflex effect of the exciting object. Definite questions now immediately arise—questions very different from those which were the only possible ones without this view Those were questions of classification Which are the proper genera of emotion and which the species under each or of description "By what ex pression is each emotion characterized? The questions now are *causal* Just what chan es does this object and what changes does that object excite and How come they to excite these particular changes and not others? We step from a superficial to a deep order of inquiry Classification and description are the lowest tage of science. They sink into the background the moment questions of genesis are formulated and remain important only so far as they facili tate our answerin these. Now the moment the genesis of an emotion is ac counted for as the arousal by an object of a lot of reflex acts which are forth with felt *we immediately see why there is no limit to the number of possible different emotions which may exist and why the emotions of different indi-*

reader has never paid attention to this matter he will be both interested and astonished to learn how many different local bodily feelings he can detect in himself as characteristic of his various emotional moods It would be perhaps too much to expect him to arrest the tide of any strong gust of passion for the sake of any such curious analysis as this but he can observe more tranquil states and that may be assumed here to be true of the greater which is shown to be true of the less Our whole cubic capacity is sensibly alive and each morsel of it contributes its pulsations of feeling dim or sharp pleasant painful or dubious to that sense of personality that every one of us unfailingly carries with him It is surprising what little items give accent to these complexes of sensibility When worried by any slight trouble one may find that the focus of one s bodily consciousness is the contraction often quite inconsiderable of the eyes and brows When momentarily embarrassed it is something in the pharynx that compels either a swallow a clearing of the throat or a slight cough and so on for as many more instances as might be named Our concern here being with the general view rather than with the details I will not linger to discuss these but assuming the point admitted that every change that occurs must be felt I will pass on

I now proceed to urge the vital point of my whole theory which is this *If we fancy some strong emotion and then try to abstract from our consciousness of it all the feelings of its bodily symptoms we find we have nothing left behind* no mind stuff out of which the emotion can be constituted and that a cold and neutral state of intellectual perception is all that remains It is true that although most people when asked say that their introspection verifies this statement some persist in saying theirs does not Many cannot be made to understand the question When you beg them to imagine away every feeling of laughter and of tendency to laugh from their consciousness of the ludicrousness of an object and then to tell you what the feeling of its ludicrousness would be like whether it be anything more than the perception that the object belongs to the class funny they persist in replying that the thing proposed is a physical impossibility and that they always *must* laugh if they see a funny object

Of course the task proposed is not the practical one of seeing a ludicrous object and annihilating one s tendency to laugh It is the purely speculative one of subtracting certain elements of feeling from an emotional state supposed to exist in its fulness and saying what the residual elements are I cannot help thinking that all who rightly apprehend this problem will agree with the proposition above laid down What kind of an emotion of fear would be left if the feeling neither of quickened heart beats nor of shallow breathing neither of trembling lips nor of weakened limbs neither of goose flesh nor of visceral stirrings were present it is quite impossible for me to think Can one fancy the state of rage and picture no ebullition in the chest no flushing of the face no dilatation of the nostrils no clenching of the teeth no impulse to vigorous action but in their stead limp muscles calm breathing and a placid face? The present writer for one certainly cannot The rage is as completely evaporated as the sensation of its so called manifestations and the only thing that can possibly be supposed to take its place is some cold blooded and dispassionate judicial sentence confined entirely to the intellectual realm to the effect that a certain person or persons merit chastisement for their sins In like manner of grief what would it

ports so far as I know of but three In the famous one of Remigius Leins no mention is made by the reporters of his emotional condition In Dr G Winter s case[1] the patient is said to be inert and phlegmatic but no particular attention as I learned from Dr W was paid to his psychic condition In the extraordinary case reported by Professor Strumpell (to which I must refer later in an other connection) we read that the patient a shoemaker s apprentice of fifteen entirely anæsthetic inside and out with the exception of one eye and one ear had shown *shame* on the occasion of soilin his bed and *grief* when a formerly favorite dish was set before him at the thought that he could no longer taste its f n ll l o kind nough to inform me that he manifested *sur*

[illegible]

poss [illegible]
blood with no inward feeling so his emotional expressions may have been accompanied by a quite cold heart Any new case which turns up of generalized anæsthesia ought to be carefully examined as to the inward emotional sens bil ity as distinct from the expressions of emotion which circumstances may bring forth.

Objections Considered

Let me now notice a few objections The replies will make the theory still more plausible

First Objection There is no real evidence it may be said for the assumption that particular perceptions *do* produce wide-spread bodily effects by a sort of immediate physical influence antecedent to the arousal of an emotion or emotional idea

Reply There is most assuredly such evidence In listening to poetry drama or heroic narrative we are often surprised at the cutaneous shiver which like a

[1] *Ein Fall on allg m er Anaesthesie* (Heidelberg 88)
Ziemssen D t k A hi fur klinis h M dici xxII, p 3 1

[2] The t ry mm cases f hy t rical h mianæsth sia ot mpl t gh t be tilized in this inq ury M eo th t esearches f which m cc unt was gi en in Chapter iv tend t sh w that hysterical æsthesia is t eal bsen f en sibility b t dissociati as M. P rr Jan t calls t plitting-off f certain sensati ns f m th rest f the perso 's nsciousness, this t f rming th elf which remains ected w th th dinary gans f expressi n. Th *plit-off* nsci usnes f ms dary self and M Janet writes m th t h sees so why ens ti ns wh se dissociati f m th body f consci usness mak th patient p ctically anæsth ti might t theless, contribut t th m ti nal li f th patient. Th y do till trib t t th func tio f loc m ti f in his patie t L. th was taxia in sp te f th anæsthesia. M. Janet w tes me, pr pos f his anæsth ti p tient L th t sh seem d t ffer by hall cinati n. I ha ften pr cked b rned h with t w rning and wh h did ot see me. Sh er mo ed d dently pe cei ed thing B t if aft rwards in h m ments sh ca ght sight f her w nd d arm and saw h skin littl dr p f bl od re ulting from slight cut she w uld begin t cry t and lament as if sh suffered great deal. My blood fl s, sh said day I *must b* ffering great d al! Sh ffered by hall cinati This sort f uff ing is ry ge ral in hy t cs It is en gh f th m to recei th slightest hint f *modificati* in their body when their imaginatio fills up th est and in ents changes that were t felt. See the remarks p blished at a late date in J net *A tomatism p y hologique* pp 4 5

viduals may vary indefinitely, both as to their constitution and as to objects which call them forth For there is nothing sacramental or eternally fixed in reflex action Any sort of reflex effect is possible, and reflexes actually vary indefinitely as we know

We have all seen men dumb instead of talkative with joy we have seen fright drive the blood into the head of its victim instead of making him pale we have seen grief run restlessly about lamenting instead of sitting bowed down and mute etc etc and this naturally enough for one and the same cause can work differently on different men s blood vessels (since these do not always react alike) whilst moreover the impulse on its way through the brain to the vaso motor centre is differently influenced by different earlier impressions in the form of recollections or associations of ideas [1]

In short, *any classification of the emotions is seen to be as true and as natural as any other* if it only serves some purpose and such a question as What is the real or typical expression of anger or fear? is seen to have no objective meaning at all Instead of it we now have the question as to how any given expression of anger or fear may have come to exist and that is a real question of physiological mechanics on the one hand and of history on the other, which (like all real questions) is in essence answerable although the answer may be hard to find On a later page I shall mention the attempts to answer it which have been made

Difficulty of Testing the Theory Experimentally

I have thus fairly propounded what seems to me the most fruitful way of conceiving of the emotions It must be admitted that it is so far only a hypothesis, only *possibly* a true conception and that much is lacking to its definitive proof The only way coercively to *disprove* it however would be to take some emotion and then exhibit qualities of feeling in it which should be *demonstrably* additional to all those which could possibly be derived from the organs affected at the time But to detect with certainty such purely spiritual qualities of feeling would obviously be a task beyond human power We have as Professor Lange says absolutely no immediate criterion by which to distinguish between spiritual and corporeal feelings and I may add the more we sharpen our introspection the more *localized* all our qualities of feeling become (see above pp 193–94) and the more difficult the discrimination consequently grows [2]

A positive proof of the theory would on the other hand be given if we could find a subject absolutely anæsthetic inside and out but not paralytic so that emotion inspiring objects might evoke the usual bodily expressions from him but who on being consulted should say that no subjective emotional affection was felt Such a man would be like one who because he eats appears to by standers to be hungry but who afterwards confesses that he had no appetite at all Cases like this are extremely hard to find Medical literature contains re-

[1] Lange *op cit* p 75

[2] Professor Höffding in his excellent treatise on Psychology admits (p 342) the mixture of bodily sensation with purely spiritual affection in the emotions He does not however discuss the difficulties of discerning the spiritual affection (nor even show that he has fairly considered them) in his contention that it exists

ports so far as I know of but three In the famous one of Remigius Leins no mention is made by the reporters of his emotional condition In Dr G Winter s case the patient is said to be inert and phlegmatic but no particular attention as I learned from Dr W was paid to his psychic condition In the extraordinary case reported by Professor Strumpell (to which I must refer later in another connection) we read that the patient a shoemaker s apprentice of fifteen entirely anæsthetic inside and out with the exception of one eye and one ear had shown *shame* on the occasion of soiling his bed and *grief* when a formerly favorite dish was set before him at the thought that he could no longer taste its flavor Dr Strumpell is also kind enough to inform me that he manifested *sur p ise fear* and *ger* on certain occasions In observing him however no such theory as the present one seems to have been thought of and it always remains

anæsthesia ought to be carefully examined as to the inward emotional sensibility as distinct from the expressions of emotion which circumstances may bring forth.

Objections Considered

Let me now notice a few objections The replies will make the theory still more plaus ble

F rst Objection There is no real evidence it may be said for the assumption that particular perceptions *do* produce wide spread bodily effects by a sort of immediate physical influence antecedent to the arousal of an emotion or emotional idea

Reply There is most assuredly such evidence In listening to poetry drama or heroic narrative we are often surprised at the cutaneous shiver which like a

hall cinati n. I ha ft p p s f his anæsth ti p ti t L th t h seemed t uff r by f th anæsth ia

J ts A t matism p y h logique pp 4 5 the m ks p blished t lat date in p the

viduals may vary indefinitely, both as to their constitution and as to objects which call them forth For there is nothing sacramental or eternally fixed in reflex action Any sort of reflex effect is possible and reflexes actually vary indefinitely as we know

We have all seen men dumb instead of talkative with joy we have seen fright drive the blood into the head of its victim instead of making him pale we have seen grief run restlessly about lamenting instead of sitting bowed down and mute etc. etc and this naturally enough for one and the same cause can work differently on different men s blood vessels (since these do not always react alike) whilst moreover the impulse on its way through the brain to the vaso motor centre is differently influenced by different earlier impressions in the form of recollections or associations of ideas [1]

In short *any classification of the emotions is seen to be as true and as natural as any other* if it only serves some purpose and such a question as What is the real or typical expression of anger or fear? is seen to have no objective meaning at all Instead of it we now have the question as to how any given expression of anger or fear may have come to exist and that is a real question of physiological mechanics on the one hand and of history on the other which (like all real questions) is in essence answerable although the answer may be hard to find On a later page I shall mention the attempts to answer it which have been made

Difficulty of Testing the Theory Experimentally

I have thus fairly propounded what seems to me the most fruitful way of conceiving of the emotions It must be admitted that it is so far only a hypothesis only *possibly* a true conception and that much is lacking to its definitive

at the time But to detect with certainty such purely spiritual qualities of feeling would obviously be a task beyond human power We have as Professor Lange says absolutely no immediate criterion by which to distinguish between spiritual and corporeal feelings and I may add the more we sharpen our introspection the more *localized* all our qualities of feeling become (see above pp 193–94) and the more difficult the discrimination consequently grows [2]

A positive proof of the theory would on the other hand be given if we could find a subject absolutely anæsthetic inside and out but not paralytic so that emotion inspiring objects might evoke the usual bodily expressions from him but who on being consulted should say that no subjective emotional affection was felt Such a man would be like one who because he eats appears to bystanders to be hungry but who afterwards confesses that he had no appetite at all Cases like this are extremely hard to find Medical literature contains re-

[1] Lange *op* *l* p 75

of
dis
considered them) in his contention that it exists

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Objections Considered

Let me now notice a few objections The replies will make the theory still more plausible

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Ein Fall von allgemeiner Anaesthesie (Heidelberg 88)

Ziemssen Deut kes A hiv fur klinis h M dici XXII, p. 3

The t ry un mm cases f hyst rical h mia æsthesia are not complet gh t be tilized in this inquiry M reo th recent research f which me account was g en in Chapter IV tend t sh w that hyst rical anæsthesia is t real bsence f en sibility b t dissociation, as M. Pierr Jan t calls t, or splitting-off f certain sensati ns from th rest f th perso nsci usness, this est f rming th self which remains ected with th dinary rgans f expression Th split-off consci usness f rms a seco dary self and M Janet writes me that h sees easo why ensati ns wh se dissociati f m th body f consciousness makes th patient pr ctically anæsth tic, might t,

recei th slightest hint f modificati in their body when their imaginati fills p the rest and invents changes that were t felt. See th remarks p blished at later date in Janet's *A tomatisme p y hologique* pp. 4 5

sudden wave flows over us and at the heart swelling and the lachrymal effusion that unexpectedly catch us at intervals In listening to music the same is even more strikingly true If we abruptly see a dark moving form in the woods our heart stops beating and we catch our breath instantly and before any articulate idea of danger can arise If our friend goes near to the edge of a precipice we get the well known feeling of all overishness ' and we shrink back although we positively *know* him to be safe and have no distinct imagination of his fall The writer well remembers his astonishment when a boy of seven or eight at fainting when he saw a horse bled The blood was in a bucket with a stick in it and if memory does not deceive him he stirred it round and saw it drip from the stick with no feeling save that of childish curiosity Suddenly the world grew black before his eyes his ears began to buzz and he knew no more He had never heard of the sight of blood producing faintness or sickness and he had so little repugnance to it and so little apprehension of any other sort of danger from it that even at that tender age as he well remembers he could not help wondering how the mere physical presence of a pailful of crimson fluid could occasion in him such formidable bodily effects

Professor Lange writes

No one has ever thought of separat [illegible]

[illegible] way occasioned by associations memories or other mental processes The phenomena of fright follow the noise immediately without a trace of spiritual fear Many men can never grow used to standing beside a cannon when it is fired off although they perfectly know that there is danger neither for themselves nor for others—the bare sound is too much for them [1]

Imagine two steel knife blades with their keen edges crossing each other at right angles and moving to and fro Our whole nervous organization is on edge at the thought and yet what emotion can be there except the unpleasant nervous feeling itself or the dread that more of it may come? The entire fund and capital of the emotion here is the senseless bodily effect which the blades immediately arouse This case is typical of a class where an ideal emotion seems to precede the bodily symptoms it is often nothing but an anticipation of the symptoms themselves One who has already fainted at the sight of blood may witness the preparations for a surgical operation with uncontrollable heart sinking and anxiety He anticipates certain feelings and the anticipation precipitates their arrival In cases of morbid terror the subjects often confess that what possesses them seems more than anything to be fear of the fear itself In the various forms of what Professor Bain calls tender emotion although the appropriate object must usually be directly contemplated before the emotion can be aroused yet sometimes thinking of the symptoms of the emotion itself may have the same effect In sentimental natures the thought of yearning will produce real yearning And not to speak of coarser examples a mother s imagination of the caresses she bestows on her child may arouse a spasm of parental longing

In such cases as these we see plainly how the emotion both begins and ends with what we call its effects or manifestations It has no mental *status* except as

[1] *Op cit* p 63

either the vivid feeling of the m ns or the idea of them and the latter thus constitute its entire mat ought to make us see how in al a much deeper part in the consu — pose.

we can so easily formulate by its means pathological cas — der a common scheme In every asylum we find examples of absolutely unmotived fear anger melancholy or conceit and others of an equally unmotived apathy which persists in spite of the best of outward reasons why it should give way In the former cases we must suppose the nervous machinery to be so labile in some one emotional direction that almost every stimulus (however inapp op iate) causes it to upset in that way and to en ender the particular complex of feelings of which the psychic body of the emotion consists Thus to take one pec al instance if inability to draw deep breath fluttering of the heart and that peculiar epigastric change felt as precordial anxiety with an irresistible tendency to take a somewhat crouching attitude and to sit still and with perhaps other visce al processes not now known all spontaneously occur to ether in a certain person his *feeling of their combination is the emotion of* dread and he is the victim of what is known as morbid fear A friend who has had occasional attacks of this most distress ng of all maladies tells me that in his case the whole drama seems to centre about the region of the heart and respiratory apparatus that his main effort during the attacks is to get control of his insp ations and to slow his heart and that the moment he attains to breath ing deeply and to holding himself erect the dread *ipso facto* seems to depart.

The emot on here is nothing but the feeling of a bodily state and it has a purely bod ly cause

nervous dy pepsia. Some day we will suppose in the middle of the fternoo with out any arn ng o isible cause ne f these atta ks of terror comes The first thing the man feels s gre t but gue discomf rt. Then he ot es that his hea t is beating much too olently At the sam time sh cks r flash s of electri al dis-

It mu t be f sed that th cases f m bid fear in which b ti ly th heart is t m ch perturbed. These how ve fail t p anything gainst th ry f t is of se possible th t th rtical t es rmally pe cipi t f dread as mplex f ca diac and th rganic sensat ns d t eal bodily cha ge sh uld be m *p m ily* excited in brain-disease, and gi se t an hall cinati f th changes being ther — hall cinati of dread, nseq tly oexistent w th mpar ti ely calm pulse t I say t is possible, f I am ign rant f bserv ti ns which m ght test th fact. Trance, estasy tc ffer anal g us examples — t t peak f dinary dreaming U d ll these conditi ns may ha the h hest bjecti feelings, either f y ear f th m tise l and m tional sort, as result f pur nerv -c tral ti ity and y t, as I believe, w th compl t periph ral repose.

charges er another through his body and limb on of the most intense fear He is no ne is simply afraid. His mind is perfectly clear He looks for a cause of his wretched condition but sees none Presently his terror is such that he trembles violently and utters low moans his body is damp with perspiration his mouth is perfectly dry and at this stage there are no tears in his eyes though his suffering is intense When the climax of the attack is reached and passed there is a copious flow of tears or else a ment l person weeps upon the least pro ne is passed.

There are outbreaks of rage so groundless and unbridled that all must admit them to be expressions of disease For the medical layman hardly anything can be more instructive than the observation of such a pathological attack of rage especially when it presents itself pure and unmixed with other psychical disturbances This happens in that rather rare disease named transitory mania The patient predisposed to this—otherwise an entirely reasonable person—will be attacked suddenly without the slightest outward provo he words of the latest writer *ucht* Wien 1880) into a arious impulse to do violence e about him strikes kicks and throttles whomever he can catch dashes every object about which he can lay his hands on breaks and crushes what is near him tears his clothes shouts howls and roars with eyes that flash and roll and shows meanwhile all those symptoms of vaso motor congestion which we have learned to know as the concomitants of anger His face is red swollen *his cheeks hot his eyes protuberant and their whites bloodshot the heart beats* violently the pulse marks 100–1 o strokes a minute The arteries of the neck are full and pulsating the veins are swollen the saliva flows The fit lasts only a few hours and ends suddenly with a sleep of from 8 to 12 hours on waking from which the patient has entirely forgotten what has happened[2]

In these (outwardly) causeless emotional condition th r paths which are explosive are d h n Just every atever *augments our* nausea so the rror or anger is increased by each and every which stirs up the nerve centres Ab ol ime It seems akes the lead and the *intellect* may in fact be so little affected as to play the cold blooded spectator all the while and note the absence of a real object for the emotion[3]

[1] R H Bucke *Man's Moral Nature* (N Y 1879) p 97

[2] Lange *op cit* p 61

[3] I m inclin d to th nk that in some hysteriform conditions of gr ef rag etc the visceral disturbances are less strong than those which go to outward e pression We have then a tre mendous verbal display with a hollow inside Wh lst the bystand s are wru g with *com* passion or pale w th alarm the subject all th wh le lets himself go but fe ls his insincerity and wonders how long he can ke p up the performance The attacks are often surprisingly sudden in their onset. The treatment here is to intimidate the pat e t by a trong r will. Take out your temper if he takes out his Nay if thou'lt mouth I'll rant as well as thou These are the cases of apparently g eat bodily manifestation with comparatively little real

A few words from Henle may close my reply to this first objection
bodily nerves met the deas half way

Does it r
in rder to
our theory —
specially irritable share in the emotion and determine is quan
ing from an open wound, any grievous or horrid pectacle will cause pain in the
m e h re is developed a psychic excitability which

by the rgans disposed to participate in t jus as —
grounded on inferen e from the con tellations will be companied by a feeling of
opress n in the chest, so surely will a imilar feeling f oppression, when due t
disease of the thoracic organs, be ccompanied by groundless fo ebodings. So small
thing as a bubble of air rising f om the stomach through the œsophagus, and loiter
ing on its way a few minutes and exerting pressure on the heart is able during sleep
to occasion nightmare and during waking t produce a vague anxiety On th other
hand, w see that joyous thoughts dilate ur blood-vessels and that a suitable quan
tity of wine because dilates the vessels also disposes us to joyous thoughts. If both
the jest and the wine work together they supplement each other in prod cing the
emotional effect, and our demands on the jest are the more modest in proportion
as the wine takes upo itself a larger part of the task.

Second Objection If our theory be true a necessary corollary of it ought to be this that any voluntary and cold-blooded arousal of the so-called manifestations of a special emotion ought to gi e us the emotion itself Now this (the objection says) is not found *to be the case An actor can perfectly simulate an emotion* and yet be inwardly cold and we can all pretend to cry and not feel grief and feign laughter without being amused.

R ply In the majority of emotions this test is inapplicable for many of the manifestations are in organs over which we have no voluntary control Few people in pretending to cry can shed real tears for example But within the limits in which t can be verified experience corroborates rather than disproves the corollary from our theory upon which the present objection rests Every one knows how panic is increased by flight and how the giving way to the symptoms of grief or an er increases those passions themsel es Each fit of sobbing makes the sorrow more acute and calls forth another fit stronger still until at last repose only ensues with lassitude and with the apparent exhaustion of the machinery In rage t is notorious how we work ourselves up" to a climax by *epeated outbreaks of expression*. Refuse to express a passion and it dies Count ten before venting our anger and its occasion seems ridiculous Whistling to keep up courage is no mere figure of speech. On the other hand sit all day in a moping posture sigh and reply to everything with a dismal vo ce and your melancholy lingers. There is no more valuable precept *in moral education* than

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subjective emotion, which may be used to throw discredit n the theory advanced in the text —It is probable that th visceral manifestations in these cases are quite disproportionately slight, compared with those of the ocal rgans. The subject state is somewhat similar that of an actor who does not feel his part.

Op cit p —Lange lays great stress the neurotic drugs, as part f his proof that influences of physical nature upon the body are the first thing in rder in the productio of emotions.

this as all who have experience know if we wish to conquer undesirable emotional tendencies in ourselves we must assiduously and in the first instance cold bloodedly go through the *outward movements* of those contrary dispositions *which we prefer to cultivate The reward of persistency will infallibly come* in the fading out of the sullenness or depression and the advent of real cheerfulness and kindliness in their stead Smooth the brow brighten the eye contract the dorsal rather than the ventral aspect of the frame and speak in a *major key pass the genial compliment and your heart must be frigid indeed if* it does not gradually thaw!

This is recognized by all psychologists only they fail to see its full import Professor Bain writes, for example

habit of suppressing pity anger fear pride—on many trifling occasions It so it is a fact th ... n ress the nervou ... interna ... *of the* ...
interposition we may summon up a dormant feeling By acting out the external m festations we gradually infect the nerves leading to them and finally waken up the diffusive *current by a sort of action ab extra* Thus it is that we are sometimes able to assume a cheerful tone of mind by forcing a hilarious expression [1]

We have a mass of other testimony of similar effect Burke in his treatise *On the Sublime and Beautiful* writes as follows of the physiognomist Campanella

his face his gesture and his whole body ...
tude of the person he int ...
of mind he seemed to acc ...
to enter into the di positio ...
changed into the very men I have often observed [Burke now goes on in his own person] that on mimicking the looks and gestures of angry or placid or frightened or daring men I have involuntarily found my mind turned to that passion whose appearance I strove to imitate nay I am convinced it is hard to avoid it though one strove to separate the passion from its corresponding gestures [2]

Against this it is to be said that many actors who perfectly mimic the outward appearances of emotion in face gait and voice declare that they feel no emotion at all Others however according to Mr William Archer who has made

[1] *The Emotions and the Will* pp 361–62

[2] *Quoted by Dugald Ste art El me ts etc* (Hamilton s ed) III p 140 Fechner (*Vo schule der Aesthet k* p 156) says almost the same thing of himself One may find by one s own observation that the *m tation of the bodily expression of a mental condition makes* us underst nd it much better th n the me ely looki g on When I walk b hind some one whom I do not know and imitate as accurately s p ss ble hi g it and carriage I g t the most curious impression of feeling as the person himself must feel To go tripp ng and m ncing after the f shion of a young woman puts one so to speak in a feminine m od of mind

a very instructive statistical inquiry among them says that the emotion of the part masters them whenever they play it well Thus

"I often turn pale," writes Miss Isabel Bateman "in scenes of terror or great excitement. I have been told this many times, and I can feel myself getting very cold and shivering and pale in thrilling situations. "When I am playing rage or terror" writes Mr Lionel Brough, "I believe I do turn pale. My mouth gets dry my tongue cleaves to my palate. In Bob Acres for instance (in the last act) I have to ... [illegible] become inarticulate I have to swallow the

... less than a sympathetic heroine. Muscular exertion has ... [illegible] with it. ... Emotion while acting writes Mr Howe, "will induce perspiration much more than physical exertion. I always perspired profusely while acting Joseph Surface which requires little or no exertion. "I suffer from fatigue" writes Mr Forbes Robertson "in proportion to the amount of emotion I may have been called upon to go through, and not from physical exertion. "Though I have played Othello" writes Mr Coleman, "ever since I was seventeen (at nineteen I had the honor of acting the Moor to Macready's Iago) husband my resources as I may this is the one part, the part of parts which always leaves me physically prostrate. I have never been able to find a pigment that would stay on my face though I have tried every preparation in existence. Even the titanic Edwin Forrest told me that he was always knocked over in Othello and I have heard Charles Kean, Phelps, Brooke, Dillon, say the same thing. On the other hand, I have frequently acted Richard III without turning a hair"[2]

The explanation for the discrepancy among actors is probably that which these quotations suggest. The *visceral and organic* part of the expression can be suppressed in some men but not in others and on this it is probable that the chief part of the felt emotion depends Coquelin and the other actors who are inwardly cold are probably able to affect the dissociation in a complete way Prof Sikorsky of Kieff has contributed an important article on the facial expression of the insane to the *Neurologisches Centralblatt* for 1887 Having practised facial mimicry himself a great deal he says

"When I contract my facial muscles in any mimic combination, *I feel no emotional excitement* so that the mimicry is in the fullest sense of the word artificial, although quite irreproachable from the expressive point of view"

We find however from the context that Prof S's practice before the mirror has developed in him such a virtuosity in the control of his facial muscles that he can entirely disregard their natural association and contract them in any order of grouping on either side of the face isolatedly and each one alone. Probably in him the facial mimicry is an entirely restricted and localized thing without sympathetic changes of any sort elsewhere.

Third Object on Manifesting an emotion, so far from increasing it, makes it cease Rage evaporates after a good outburst it is *pent up* emotions that "work like madness in the brain.

"The Anatomy of Acting," in Longman's Magazine vol. xi, pp. 66, ..., 498 (1888) since republished in book form. p. 394. p. 496.

Reply The objection fails to discriminate between what is felt *during* and what is felt *after* the manifestation *During* the manifestation the emotion is always felt In the normal course of things this being the natural channel of discharge exhausts the nerve centres and emotional calm ensues But if tears or anger are simply suppressed whilst the object of grief or rage remains unchanged before the mind the current which would have invaded the normal channels turns into others for it must find some outlet of escape It may then work different and worse effects later on Thus vengeful brooding may replace a burst of indignation a dry heat may consume the frame of one who fain would weep or he may as Dante says turn to stone within and then tears or a storming fit may bring a grateful relief This is when the current is strong enough to strike into a pathological path when the normal one is dammed When this is so an immediate outpour may be best But here, to quote Prof Bain again

> There is nothing more implied than the fact that an emotion may be too strong to be resisted and we only waste our strength in the endeavor If we are really able to stem the torrent there is no more reason for refraining from the attempt than in the case of weaker feelings And undoubtedly the *habitual* control of the emotions is not to be attained without a systematic restraint extended to weak and strong

When we teach children to repress their emotional talk and display it is not that they may *feel* more—quite the reverse It is that they may *think* more for *to a certain extent whatever currents are diverted from the regions below must* swell the activity of the thought tracts of the brain In apoplexies and other brain injuries we get the opposite condition—an obstruction namely to the *passage of currents among the thought tracts and with this an increased tendency* of objects to start downward currents into the organs of the body The consequence is tears laughter and temper fits on the most insignificant provocation *accompanying a proportional feebleness in logical thought* and the power of volitional attention and decision —just the sort of thing from which we try to wean our child It is true that we say of certain persons that they would *feel more if they expressed less* And in another class of persons the explosive energy with which passion manifests itself on critical occasions seems correlated with the way in which they bottle it up during the intervals But these are *only* eccentric types of character and within each type the law of the last paragraph

[illegible] t d th t [illegible] gushing is his or her nor[illegible] limited [illegible] simply [illegible] produce listlessness On the other hand the ponderous and bilious s[illegible]mbering volcano *let him repress the expression of his passions as he will* will find them expire if they get no vent at all whilst if the rare occasions multiply which he deems worthy of their outbreak he will find them grow in intensity as life proceeds On the whole I cannot see that this third objection carries any weight

If our hypothesis is true it makes us *realize more deeply than ever how much* our mental life is knit up with our corporeal frame in the strictest sense of the term Rapture love ambition indignation and pride considered as feelings are *fruits of the same soil* with the grossest bodily sensations of pleasure and of pain But the reader will remember that we agreed at the outset to affirm this

only of what we then called the coarser emotions and that those inward states of emotional sensibility which appeared devoid at first sight of bodily results should be left out of our account We must now say a word or two about these latter feelings the subtler emotions as we then agreed to call them

The Subtler Emotions

[illegible]

brain The Herbartian psychologists [illegible] A mathematical demonstration may be as [illegible]

emotions we have been [illegible] And it is certain [illegible] reasons have hitherto failed [illegible] consider that by it we give [illegible] logical ideas can immedia[illegible] is it not more natural to [illegible] emotions prompted by other [illegible] immediate and the bodily express on something that comes later and is added on?

In reply to this we must immediately insist that æsthetic emotion *pure and simple* the pleasure given us by certain lines and masses and combinations of [illegible] is an absolutely sensational experience an optical or auricu[illegible]

ate pleasure in certain [illegible] there may it is true be *added* secondary pleasures and in the practical enjoyment of works of art by the masses of mankind these secondary pleasures play a great part The more *classic* one s taste is however the less relatively important are the secondary pleasures felt to be in comparison with those of the primary sensation as it comes in Classicism and romanticism have their battles

E en th [illegible] lings [illegible] the l wer senses may ha this secondary escort d [illegible] th [illegible] us-ing [illegible] associati nal trains which rev berate A fl [illegible] may fairly shak us by th ghosts of banq [illegible] t halls des rt d which [illegible] udd nly calls p [illegible] a smell may mak us feel alm st sick w th th [illegible] ft t bring [illegible] memory [illegible] gardens th t ar ruins, and pl as re h uses

u picturesque mystery and gloom
... ork of art *romantic* The classic taste brands these effects as coarse and tawdry and prefers the naked beauty of the optical and auditory sensations unadorned with frippery or foliage To the romantic mind on the contrary the immediate beauty of these sensations seems dry ... of course not discussing ... ma... ... ...ual
...hich are grafted thereupon is one that must be made

These secondary emotions themselves are assuredly for the most part constituted of other incoming sensat on
effects

And these
... of pathos
... voice breaks and the sob rises in the struggling chest or the nostril dilates and the fingers tighten whilst the heart beats etc etc

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skeleton from a feast or painted landscapes in the brain of man It is the mingled souls of wheat and corn In it you will find the sunshine and shadow that chase each other over the billowy fields the breath of June the carol of the lark the d s of th night the wealth of summer and autumn s rich content—all golden with imprisoned light Drink it and you will hear the voice of men and maidens singing the *Harvest Home* mingled with the laughter of children Drink it and you will feel within your blood the star lit dawns, the dreamy tawny dusks of many perfect days For forty years this liquid joy has been within the happy staves of oak longing to touch the lips of man —It is in this way that I should reply to Mr Gurney s criticism n my theory My ... this writer says (*M d* ix p. 425) goes far to confound the two things which n my opin on it is the prime necessity of musical psychology to distinguish—the effect chiefly sensuous of mere streams or masses of finely colored sound and the distinctive musical emot on to which the *form* of a sequence of sound its melodic and harmonic individuality even realized in complete silence is the vital and essential object It is with the former of these two very different things that the physical reactions the stirring of the hair—the tingling and the ... —are by far most markedly connected If I may speak of myself there is plenty of music from which I have received as much emotion in silent representation as when presented by the finest orchestra but it s with the latter condition that I almost exclusively asso ciate the cutaneous tingling and hair stirring But to call my enjoyment of the *form* of the *note* ... of a melody a mere critical judgment of right [see below p 757] would really be to deny to me the power of expressi g a fact of simple and ...
quintessentially emotion
judge to be *right* without rece...
are to me like geometrical dem... of interr...
Beethoven s rightne...

... ...us ...ion
... b described perhaps n g ... ely as ... ... le free from positively unpleasant acoustic quality In organizations a music ... s Mr Gurney s, purely acoustic form gives so intense a degree of sensible pleasure that the low ... ly reverberation is of no account But I repeat that I see nothing in the facts which Mr Gurney cites to lead one to believe in an emotion divorced from *sensational processes* of any kind.

As far as *these ingredients* of the subtler emotions go, then, the latter form no exception to our account, but rather an additional illustration thereof. In all cases of intellectual or moral rapture we find that, unless there be coupled a bodily reverberation of some kind with the mere thought of the object and cognition of its quality; unless we actually laugh at the neatness of the demonstration or witticism; unless we thrill at the case of justice, or tingle at the act of magnanimity; our state of mind can hardly be called emotional at all. It is in fact a mere intellectual perception of how certain things are to be called—neat, right, witty, generous, and the like. Such a judicial state of mind as this is to be classed among awarenesses of truth; it is a *cognitive* act. As a matter of fact, however, the moral and intellectual cognitions hardly ever do exist thus unaccompanied. The bodily sounding-board is at work, as careful introspection will show, far more than we usually suppose. Still, where long familiarity with a certain class of effects, even æsthetic ones, has blunted mere emotional excitability as much as it has sharpened taste and judgment, we do get the intellectual emotion, if such it can be called, pure and undefiled. And the dryness of it, the paleness, the absence of all glow, as it may exist in a thoroughly expert critic's mind, not only shows us what an altogether different thing it is from the "coarser" emotions we considered first, but makes us suspect that almost the entire difference lies in the fact that the bodily sounding-board, vibrating in the one case, is in the other mute. "Not so very bad" is, in a person of consummate taste, apt to be the highest limit of approving expression. "*Rien ne me choque*" is said to have been Chopin's superlative of praise of new music. A sentimental layman would feel, and ought to feel, horrified, on being admitted into such a critic's mind, to see how cold, how thin, how void of human significance, are the motives for favor or disfavor that there prevail. The capacity to make a nice spot on the wall will outweigh a picture's whole content; a foolish trick of words will preserve a poem; an utterly meaningless fitness of sequence in one musical composition set at naught any amount of 'expressiveness' in another.

I remember seeing an English couple sit for more than an hour on a piercing February day in the Academy at Venice before the celebrated *Assumption* by Titian; and when I, after being chased from room to room by the cold, concluded to get into the sunshine as fast as possible and let the pictures go, but before leaving drew reverently near to them to learn with what superior forms of susceptibility they might be endowed, all I overheard was the woman's voice murmuring: "What a *deprecatory* expression her face wears! What *self-abnegation*! How *unworthy* she feels of the honor she is receiving!" Their honest hearts had been kept warm all the time by a glow of spurious sentiment that would have fairly made old Titian sick. Mr. Ruskin somewhere makes the (for him terrible) admission that religious people as a rule care little for pictures, and that when they do care for them they generally prefer the worst ones to the best. Yes! in every art, in every science, there is the keen perception of certain relations being *right* or not, and there is the emotional flush and thrill consequent thereupon. And these are two things, not one. In the former of them it is that experts and masters are at home. The latter accompaniments are bodily commotions that they may hardly feel, but that may be experienced in their fulness by *crétins* and philistines in whom the critical judgment is at its lowest ebb. The 'marvels' of Science, about which so much edifying popular literature is

written are apt to be caviare to the men in the laboratories And even divine Philosophy itself which common mortals consider so sublime an occupation, on account of the vastness of its data and outlook is *too apt to the practical* philosopher himself to be but a sharpening and tightening business a matter of points of screwing down things of splitting hairs and of the intent rather than the extent of conceptions Very little emotion here!—except the effort of setting the attention fine and the feeling of ease and relief (mainly in the breathing apparatus) when the inconsistencies are overcome and the thoughts run smoothly for a while Emotion and cognition seem then parted even in this last retreat and cerebral processes are almost feelingless so far as we can judge, until they summon help from parts below

No Special Brain centres for Emotion

If the neural process underlying emotional consciousness be what I have now sought to prove it the physiology of the brain becomes a simpler matter than has been hitherto supposed Sensational associational and motor elements are all that the organ need contain The physiologists who during the past few years have been so industriously exploring the brain s functions have limited their explanations to its cognitive and volitional performances Dividing the brain into sensory and motor centres they have found their division to be exactly paralleled by the analysis made by empirical psychology of the perceptive and volitional parts of the mind into their simplest elements But the emotions have been so ignored in all these researches that one is tempted to suppose that if these investigators were asked for a theory of them in brain terms they would have to reply either that they had as yet bestowed no thought upon the subject or that they had found it so difficult to make distinct hypotheses that the matter lay among the problems of the future only to be taken up after the simpler ones of the present should have been definitely solved

And yet it is even now certain that of two things concerning the emotions one must be true Either separate and special centres affected to them alone are their brain seat or else they correspond to processes occurring in the motor and sensory centres already assigned or in others like them not yet known If *the former be the case we must deny the view that is current* and hold the cortex to be something more than the surface of projection for every sensitive spot and every muscle in the body If the latter be the case we must ask whether the emotional *process* in the sensory or motor centre be an altogether peculiar one or whether it resembles the ordinary perceptive processes of which those centres are *already recognized to be the seat Now if the theory I have defended* be true the latter alternative is all that it demands Supposing the cortex to contain parts liable to be excited by changes in each special sense-organ in each portion of the skin in each muscle each joint and each viscus and to contain absolutely nothing else we still have a scheme capable of representing the process of the emotions *An object falls on a sense organ affects a cortical part* and is perceived or else the latter excited inwardly gives rise to an idea of the same object Quick as a flash the reflex currents pass down through their preordained channels alter the condition of muscle skin and viscus and these al

terations perceived like the original object in as many portions of the cortex combine with it in consciousness and transform it from an object simply-apprehended into an object-emotionally felt. No new principles have to be invoked nothing postulated beyond the ordinary reflex circuits and the local centres admitted in one shape or another by all to exist.

Emotional Differences between Individuals

The revivability in memory of the emotions like that of all the feelings of the lower senses is very small. We can remember that we underwent grief or rap-
1 ... felt This difficult *ideal* revivability
1

or rapture but new griefs and raptures by summ... their exciting cause The cause is now only an idea but this idea produces the same organic irradiations or almost the same which were produced by its original so that the emotion is again a reality We have recaptured it. Shame love and anger are particularly liable to be thus revived by ideas of their object Professor Bain admits that in their strict character of emotion proper they [the emotions] have the minimum of revivability but being always incorporated with the sensations of the higher senses they share in the superior revivability of sights and sounds. But he fails to point out that the revived sights and sounds may be *ideal* without ceasing to be distinct whilst the emotion to be distinct must become real again. Prof Bain seems to forget that an ideal emotion and a real emotion prompted by an ideal object are two very different things

A emotional temperament on the one hand and a lively imagination for objects and circumstances on the other are thus the conditions necessary and sufficient for an abundant emotional life No matter how emotional the temperament may be, if the imagination be poor the occasions for touching off the emotional trains will fail to be realized and the life will be *pro tanto* cold and dry This is perhaps a reason why it may be better that a man of thought should not have too strong a visualizing power He is less likely to have his trains of meditation disturbed by emotional interruptions It will be remembered that

at present ... torpor of hoary eld or with the omnibus-horse routine of settled professional and domestic life I say this because I occasionally have a flash of the old stronger visual imagery and I notice that the emotional commentary so to call it is then liable to become much more acute than is its present wont. Charcot s

In his chapter on Ideal Emotion, to which the reader is referred for farther details on this subject.

himself suggests because he could form no definite visual image of the event and of the effect of the loss on the rest of the family at home

One final generality about the emotions remains to be noted *They blunt themselves by repetition more rapidly than any other sort of feeling* This is due not only to the general law of accommodation to their stimulus which we saw to obtain of all feelings whatever but to the peculiar fact that the diffusive wave of reflex effects tends always to become more narrow It seems as if it were essentially meant to be a provisional arrangement on the basis of which precise and determinate reactions might arise The more we exercise ourselves at anything the fewer muscles we employ and just so the oftener we meet an object the more definitely we think and behave about it and the less is the organic perturbation to which it gives rise The first time we saw it we could perhaps neither act nor think at all and had no reaction but organic perturbation The emotions of startled surprise wonder or curiosity were the result Now we look on with absolutely no emotion [1] This tendency to economy in the nerve-paths through which our sensations and ideas discharge is the basis of all growth in efficiency readiness and sl ill Where would the general the surgeon the presiding chairman be if their nerve currents kept running down into their viscera instead of keeping up amid their convolutions? But what they gain for practice by this law they lose it must be confessed for feeling For the world worn and experienced man the sense of pleasure which he gets from the free and powerful flow of thoughts overcoming obstacles as they arise is the only compensation for that freshness of the heart which he once enjoyed This free and powerful flow means that brain paths of association and memory have more and more *organized themselves in him* and that through them the *stimulus* is drafted off into nerves which lead merely to the writing finger or the speaking tongue [2] The trains of *intellectual* association the memories the logical relations may however be voluminous in the extreme Past emotions may be among the things remembered The more of all these trains an object can set going in us the richer our cognitive intimacy with it is This cerebral sense of richness seems itself to be a source of pleasure possibly even apart from the *euphoria*

[1] Those feelings which Prof Bain calls mot ons of relativity excitement of novelty wonder rapture of freedom sense of power hardly survive any repetition of the experience. But as the text goes on to explain and as Go the as qu ted by Pr f Hoffd ng ays th s is because the soul is inwardly g wn larger without knowin it and can no long be filled by that fir t sensation The man th nks that he has lost but r ally he has gain d What he has lost in raptur he has gained in in ard growth It is as Prof H ffd ng himself adds n a b aut ful f gure of pe ch ith our rg n fe l ng as ith the fir t b eath d awn by the new b rn child in wh ch the lung expands its lf so that it can n ver be mpt d to the same degre again No late b eath can f el ju t l ke that first one On this whole subject of emot onal blunting compare H ffd ng *Psycl log* rv E and B in *Tl Em t ons and the Will* pt i chap iv

[2] M Fr Paulhan n a little work full of accu ate observat ons of detail (*Les Phénomèn s aff ct fs et l l s d l u apparit n*) se ms to me rather to turn the truth upside down by his fo mula that emoti ns are due to an nhib t on f mpul t nd n s *One* kind f emotion *namely* uneas n ss annoyance distres does occur when any d fin te impul ive tendency is ch cked and all of M Paulhan s llu trat ns are drawn from th s et The other emotions are th mselves p *imary impuls ve tend nc s of a d ffu* sort (nv l ing as M Paulhan rightly says a *mult pl ité d phén n è*) n l ju t n p op t n as m e and more of these mult ple tend ncies a e check d and r *placed by s me l w nar w l rms* of discharge d es the original em ti n t nd to disapp

which from time to time comes up from respiratory organs If there *be* such a thing as a purely spiritual emotion I should be inclined to restrict it to this cerebral ense of abundance and ease this feeling as Sir W Hamilton would call it of unimpeded and not overstrained activity of thought Under ordinary condi t ons it is a fine and serene but not an excited state of consciousness In certain intoxications it becomes exciting and it may be intensely excit ng I can hardly imagine a more frenzied excite h hat which goes with the conscious ness of seeing absolute truth v oxide drunkenness Chloroforn

l

where to be maintained these theoretic rap

gin the defence

The Genesis of the Various Emotions

On a former page (p 745) I said that two questions and only two are important if we regard the emotions as constituted by feelings due to the diffusive wa e

(1) *What special diffus ve effects do the various special objective and sub ject ve exp riences exc te?* and

(2) *How come they to excite them?*

The works on physiognomy and e pression are all of them attempts to answer question As is but natural the effects upon the face have received the most careful attent on The reader who wishes deta ls additional to those given abo e on pp 738–41 is referred to the works mentioned in the note below[1]

As regards question 2 some l ttle progress has of recent years been made in answe ng t Two things are certain

a The facial muscles of expression are not given us simply for expression s sake

b Each muscle is not affected to some one emotion exclusively as certain writers have thought

Some mo ements of express on can be accounted for as *weakened repetitions of mo eme ts wh ch forme ly* (when they were stronger) *were of utility to the s bject* Others are s milarly weakened repetitions of movements which under othe conditions were *physiolog cally necessary effects* Of the latter reactions the espiratory distu bances n anger and fear mi ht be taken as examples—or gan c reminiscences as it were reverberations *in im g nation of the blowings*

[1] A list f th ld writings th bj t is gi in M t gaz w k *La Ply m t I' pr sio* ch p ther in Darwin first ch pt *Th E pr si f th E iot ns* B ll *A at my f Expr ss* M sso *La P* P d nt *W is ns hafllich Sy t m d M mik nd Phy g m k* D ch nn *Mé m de la physion m h ma* besid La d D rw th m t seful Ls w th which I m q aint d C mp lso Sully S sau and I t it ch p ii.

One must rm mbe h er that j t in so far f rth as sexual l ti may ha played part in d termining th h man rganism sel cti f expressi f ces must ha increased the g m bility f th h man unt nance

of the man making a series of combative efforts of the pantings of one in precipitate flight Such at least is a suggestion made by Mr Spencer which has found approval And he also was the first so far as I know to suggest that other movements in anger and fear could be explained by the nascent excitation of formerly useful acts

> To have in a slight degree [he says] such psychical states as accompany the reception of wounds and are experienced during flight is to be in a state of what we call fear And to have in a slight degree such psychical states as the processes of catching killing and eating imply is to have the desires to catch kill and eat That the propensities to the acts are nothing else than nascent excitations of the psychical state involved in the acts is proved by the natural language of the propensities Fear when strong expresses itself in cries in efforts to escape in palpitations in tremblings and these are just the manifestations that go along with an actual suffering of the evil feared The destructive passion is shown in a general tension of the muscular system in gnashing of teeth and protrusion of the claws in dilated eyes and nostrils in growls and these are weaker forms of the actions that accompany the killing of prey To such objective evidences every one can add subjective evidences Every one can testify that the psychical state called fear consists of mental representations of certain painful results and that the one called anger consists of mental representations of the actions and impressions which would occur while inflicting some kind of pain [1]

About fear I shall have more to say presently Meanwhile the principle of *revival in weakened form of reactions useful in more violent dealings with the object inspiring the emotion* has found many applications So slight a symptom as the snarl or sneer the one sided uncovering of the upper teeth is accounted for by Darwin as a survival from the time when our ancestors had large canines and unfleshed them (as dogs now do) for attack Similarly the raising of the eyebrows in outward attention the opening of the mouth in astonishment come according to the same author from the utility of these movements in extreme cases The raising of the eyebrows goes with the opening of the eye for better vision the opening of the mouth with the intensest listening and with the rapid catching of the breath which precedes muscular effort The distention of the nostrils in anger is interpreted by Spencer as an echo of the way in which our ancestors had to breathe when during combat their mouth was filled up by a part of an antagonist s body that had been seized (!) The trembling of fear is supposed by Mantegazza to be for the sake of warming the blood (!) The reddening of the face and neck is called by Wundt a compensatory arrangement for relieving the brain of the blood pressure which the simultaneous excitement of the heart brings with it The effusion of tears is explained both by this author and by Darwin to be a blood withdrawing agency of a similar sort The contraction of the muscles around the eyes of which the primitive use is to protect those organs from being too much gorged with blood during the screaming fits of infancy survives in adult life in the shape of the frown which instantly comes over the brow when anything difficult or displeasing presents itself either to thought or action

> As the habit of contracting the brows has been followed by infants during innumerable generations at the commencement of every crying or screaming fit [says Darwin] it has become firmly associated with the incipient sense of something distressing

[1] *Psychology* § 213

ing begins to be voluntarily estrained ...
hardly ever restrained at any age [1]

The intermittent expirations which constitute laughter have according to Dr Hecker the purpose of counteracting the anæmia of the brain which he supposes to be brought about by the action of the joyous or comic stimulus upon the vaso-motor nerves A smile is the weak vestige of a laugh The tight closure of the mouth in all effort is useful for retaining the air in the lungs so as to fix the chest and give a firm basis of insertion for the muscles of the flanks Accordingly we see the lips compress themselves upon every slight occasion of resolve The blood pressure has to be high durin the sexual embrace hence the palpitations and hence also the tendenc
tender emotion in its fainter forms
are quite enough to show the scope ...
in weaker form

Another principle to which Darwin perhaps hardly does sufficient justice may be called the principle of *reacting similarly to analogous feeling stimuli* There is a whole vocabulary of descriptive adjectives common to impressions belonging to different sensible spheres—experiences of all classes are *sweet* impressions of all classes *rich* or *solid* sensations of all classes *sharp* Wundt and Piderit accordingly explain many of our most expressive reactions upon moral causes as symbolic gustatory movements As soon as any experience arises which has an affinity with the feeling of sweet or bitter or sour the same movements are executed which would result from the taste in point All the states of mind which language designates by the metaphors bitter harsh sweet combine themselves therefore with the corresponding mimetic movements of the [illegible] the emotions of disgust and satisfaction do express them

if learned work the attempt is made much less successfully to bring in the

selecti [illegible] natural selecti [illegible] chap IX, § VI) [illegible] same [illegible] by Darwin and [illegible]

[illegible] body (Cf *Physiol. P y h* II, p 423)

eye and ear as additional sources of symbolically expressive reaction The ordinary gesture of negation—among us moving the head about its axis from side to side—is a reaction originally used by babies to keep disagreeables from getting into their mouth and may be observed in perfection in any nursery[1] It is now evoked where the stimulus is only an unwelcome idea Similarly the nod forward in affirmation is after the analogy of taking food into the mouth The connection of the expression of moral or social disdain or dislike, especially in women with movements having a perfectly definite original olfactory function is too obvious for comment Winking is the effect of any threatening surprise not only of what puts the eyes in danger and a momentary aversion of the eyes is very apt to be one s first symptom of response to an unexpectedly unwelcome proposition —These may suffice as examples of movements expressive from analogy

But if certain of our emotional reactions can be explained by the two principles invoked—and the reader will himself have felt how conjectural and fallible in some of the instances the explanation is—there remain many reactions which cannot so be explained at all and these we must write down for the present as purely idiopathic effects of the stimulus Amongst them are the effects on the viscera and internal glands, the dryness of the mouth and diarrhœa and nausea of fear the liver disturbances which sometimes produce jaundice after

dial ' *anxiety of dread the changes in the pupil the various sweatings of the* skin cold or hot local or general and its flushings together with other symptoms which probably exist but are too hidden to have been noticed or named It seems as if even the changes of blood pressure and heart beat during emotional excitement might instead of being teleologically determined prove to be purely mechanical or physiological outpourings through the easiest drainage-channels—the pneumogastrics and sympathetic nerves happening under ordinary circumstances to be such channels

Mr Spencer argues that the *smallest* muscles must be such channels and instances the tail in dogs cats and birds the ears in horses the crest in parrots the face and fingers in man as the first organs to be moved by emotional stimuli[2] This principle (if it be one) would apply still more easily to *the muscles of* the smaller arteries (though not exactly to the heart) whilst the great variability of the circulatory symptoms would also suggest that they are determined

[1] Professor Henle der ves th negative wag f the head from n incipient shudd r and remarks how fortunate is the abbrev ation as when a lady declines a partner in the ballroom The clapping of the hands for applause he explains a br ce The protrusion of the lips (*der prufer de Z g*) and question ng states of mi d is d ived by Dr P de — — v e can see on a yone s m uth when deciding whether a wine is good or not

[2] *Loc cit* § 497 Why a dog s f ce muscl s a e ot more mobile tha they are Mr Spencer fails to explain as also why diffe t stimuli should in ervate these small muscles in such differ nt w ys if easy dr nage be the o ly principle invol ed Cha les Bell accounted for the speci l pa t played by the fac al muscles in expression by th ir being *accessory muscles of respirat on* governed by nerves whose origin is close to the r spiratory ce tre in the medulla oblongata They are n adjuvant of *vo ce* and l ke it th r function is *commu icat on* (See Bell s *A atomy of Exp ssion* Appe dix by Al nder Shaw)

by causes into which utility does not enter The quickening of the heart lends itself it is true rather easily to explanation by inherited habit organic memory of more violent excitement and Darwin speaks in favor of this view (see his *Exp ession* etc pp 74–75) But on the other hand we have so many cases of reaction which are indisputably pathological as we may say and which could never be se wh t was serviceable that I think we should be c far in the te besides tha logical So sult of his stu follows

We ha e se are positi ely that the t em on inced ou see [o to think] th when we re tranquil In face of such t ct we mus the phenomen f fe r cann t all be accou ted f r by selection Th ir ext eme degrees are mo b d phenomena which h w an imp fect on the organism W might almost say that N ture had not b en able to frame a substance which should be exc t ble n ugh t c mpose the b ain and spinal marrow and yet which should not be so excited by ex epti al timul tion as to overstep in ts rea tions those phys ological bounds which a usef l to the co ervati n of the creatu e

Professor Bain if I mistake not had long previously commented upon fear

impotence raised eyebrows and shrugged shoulders dropped arms and open palms *as being the antithesis of the frownin brow the thrown back shoulders* and clenched fists of rage which is the emotion of power No doubt a certain number of movements can be formulated under this law but whether it ex p esses a *causal* p inciple is more than doubtful It has been by most critics con sidered the least successful of Darwin s speculations on this subject

To sum up we see the reason for a few emotional reactions for others a pos sible pecies of reason may be guessed but others remain for which no plausi ble reason can e en be conceived These may be reactions which are purely mechanical e ults of the way in which our nervous centres are framed react ons wh ch although permanent in us now may be called accidental as far as their g n goes In fact n an organism as complex as the nervous system there m t be m ny such eactions incidental to others evolved for utility s sake but which would never themselves have been evolved independently for any utility th y m ght possess Sea s ckness the lo e of music of the various intoxicants nay the enti e æsthetic life of man shall have to trace to this acc dental origin It w ld be foolish to suppose that no e of the reactions called emotional could ha e arisen in this *quas* accidental way

La P ur Appendix, p 95 See bel w p 857

This is all I have to say about the emotions If one should seek to name each particular one of them of which the human heart is the seat it is plain that the limit to their number would lie in the introspective vocabulary of the seeker each race of men having found names for some shade of feeling which other races have left undiscriminated If then we [illegible]

[illegible] as a basis and that all groupings would be equally real and true The only question would be does this grouping or that suit our purpose best? The reader may then class the emotions as he will as sad or joyous sthenic or asthenic natural or acquired inspired by animate or inanimate things formal or material, sensuous or ideal direct or reflective egoistic or non egoistic retrospective prospective or immediate organismally or environmentally initiated or what more besides All these are divisions which have been actually proposed Each of them has its merits and each one brings together some emotions which the others keep apart

For a fuller account and for other classificatory schemes I refer the reader to the Appendix to Bain s *The Emotions and the Will* and to Mercier s Stanley s and Reid s articles on the Emotions in *Mind* vols IX X and XI In vol IX p 421 there is also an article by the lamented Edmund Gurney in criticism of the view which in this chapter I continue to defend

Chapter XXVI

WILL

DESIRE wish will are states of mind which everyone knows and which no definition can make plainer We desire to feel to have to do all sorts of things which at the moment are not felt had or done If with the desire there goes a sense that attainment is not possible we *simply wish* but if we believe that the end is in our power we *will* that the desired feeling having or doing shall be real and real it presently becomes either immediately upon the willing or after certain preliminaries have been fulfilled

The only ends which follow *immediately* upon our willing seem to be movements of our own bodies Whatever *feelings* and *havings* we may will to get come in as results of preliminary movements which we make for the purpose This fact is too familiar to need illustration so that we may start with the proposition that the only *direct* outward effects of our will are bodily movements The mechanism of production of these voluntary movements is what befalls us to study now The subject involves a good many separate points which it is difficult to arrange in any continuous logical order I will treat of them successively in the mere order of convenience trusting that at the end the reader will gain a clear and connected view

The movements we have studied hitherto have been automatic and reflex and (on the first occasion of their performance at any rate) unforeseen by the agent The movements to the study of which we now address ourselves being desired and intended beforehand are of course done with full prevision of what they are to be It follows from this that *voluntary movements must be secondary not primary functions of our organisms* This is the first point to understand in the psychology of Volition Reflex instinctive and emotional movements are all primary performances The nerve-centres are so organized that certain stimuli pull the trigger of certain explosive parts and a creature going through one of these explosions for the first time undergoes an entirely novel experience The other day I was standing at a railroad station with a little child when an express-train went thundering by The child who was near the edge of the platform started winked had his breathing convulsed turned pale burst out crying and ran frantically towards me and hid his face I have no doubt that this youngster was almost as much astonished by his own behavior as he was by the train and more than I was who stood by Of course if such a reaction has many times occurred we learn what to expect of ourselves and can then foresee our conduct even though it remain as involuntary and uncontrollable as it was before But if in voluntary action properly so called the act must be foreseen it follows that no creature not endowed with divinatory power can perform an act voluntarily for the first time Well we are no more endowed with prophetic

vision of what movements lie in our power than we are endowed with prophetic vision of what sensations we are capable of receiving As we must 1 1 t f r the
med
We
learn all our possibilities by the way of experience When a particular movement having once occurred in a random reflex or involuntary way, has left an image of itself in the memory then the movement can be desired again proposed as an end and deliberately willed But it is impossible to see how it could be willed before

A supply of ideas of the various movements that are possible left in the memory by experiences of their involuntary performance is thus the first prerequisite of the voluntary life

Now the same movement involuntarily performed may leave many different kinds of ideas of itself in the memory If performed by another person we of course *see* it or we *feel* it if the moving part strikes another part of our own body Similarly we have an auditory image of its effects if it produces sounds as for example when it is one of the movements made in vocalization or in playing on a musical instrument All these *remote* effects of the movement, as we may call them, are also produced by movements which we ourselves perform and they leave innumerable ideas in our mind by which we distinguish each movement from the rest It *looks* distinct it *feels* distinct to some distant part of the body which it strikes or it *sounds* distinct These remote effects would then, rigorously speaking suffice to furnish the mind with the supply of ideas required

But in addition to these impressions upon remote organs of sense we have whenever we perform a movement ourselves another set of impressions those namely which come up from the parts that are actually moved These *kinæsthetic* impressions as Dr Bastian has called them are so many *resident* effects of the motion Not only are our muscles supplied with afferent as well as with efferent nerves but the tendons the ligaments the articular surfaces and the skin about the joints are all sensitive and being stretched and squeezed in ways characteristic of each particular movement give us as many distinctive feelings as there are movements possible to perform

It is by these resident impressions that we are made conscious of *passive movements*—movements communicated to our limbs by others If you lie with closed eyes and another person noiselessly places your arm or leg in any arbi

himself lying At least this is what happens when the nervous apparatus is normal But in cases of disease we sometimes find that the resident impressions do not normally excite the centres and that then the sense of attitude is lost It is only recently that pathologists have begun to study these anæsthesias with the delicacy which they require and we have doubtless yet a great deal to learn

[1] I am abstracting at present for simplicity s sake and so as t keep to the eleme ts of the matter from the learning of acts by see ng others do them

about them The skin may be anæsthetic and the muscles may not feel the cramp-like pain which is produced by faradic currents sent through them and yet the sense of passive movement may be retained It seems in fact to persist more obstinately than the other forms of sensibility for cases are comparatively common in which all the other feelings in the limb but this one of attitude are lost. In Chapter xx I have tried to make it appear that the articular surfaces are probably the most important source of the resident kinæsthetic feelings But the determination of their special organ is indifferent to our present quest It is enough to know that the existence of these feelings cannot be denied

When the feelings of passive movement as well as all the other feelings of a limb are lost we get such results as are given in the following account by Professor A. Strumpell of his wonderful anæsthetic boy whose only sources of feeling w[illegible] d h left ear

[illegible]

second p[illegible] carried him about the [r]oom laid him [o]n a table, given to his [illegible] [v]arious fantastic and apparently th[e] most incon[v]enient attitudes without his ha[v]ing [illegible] suspicion of it. The expression of a[s]t[o]nishment in his f[a]ce wh[e]n [a]ll at once the re[illegible] Only [illegible] of the hand[illegible] ch[ie]f revealed his situation [illegible] is indescribable in words. [illegible] when his head was made to hang away d[o]wn he immediately spoke of dizziness but could not assign its ground. Later h[e] sometimes inferred from the sounds connected with t[he] manipulation that something special was being done with him. He had [no] feelings of muscular fatigue. [illegible] eyes sh[u]t we told him to raise his arm and t[o] keep it up he did so w[ithout] [illegible] arm began to trembl[e] and sink [illegible] him to keep it up [illegible] Pass[illegible] [illegible] constantly that he [o]pened and shut his hand, whereas [i]t was really fixed.

Or we read of cases like this

Voluntary movements cannot be estimated the moment the patient ceases to take note of them by his eyes. Thus after having mad[e] him close his eyes if [o]ne asks him to mo[v]e [on]e of his limbs either wholly or in part he does [i]t but cannot tell whether the executed m[ov]ement [is] larg[e] or small [illegible] [or] weak, even if it has taken pla[ce] at all. And when h[e] opens his eyes after moving his leg from right to left, for example he declares that h[e] had a [v]ery inexact notion of the extent of the executed movement If having the intention of executing a certain movement *I prevent him* h[e] does [n]ot perceive it and supposes the limb to have taken the position he intended to give it

Or this

The patient when his eyes were closed in the middle of an unpractised movement, remained with the ex[tr]emit[y] in the position [i]t had when the eyes closed and did not complete the movement properly Then after some oscillations the limb gradually sank by reason of its weight (the sense of fatigue being absent) Of this the patient

Deutsch A[rchiv] f k[lin] M[e]dicin xxii, p. 3

Landry Mémoire sur la paralysie du sens musculaire Gazette des Hôpitaux 855 p. [illegible]

was not aware and wondered when he opened his eyes at the altered position of his limb [1]

A similar condition can be readily reproduced experimentally in many hypnotic subjects All that is needed is to tell a suitably predisposed person during the hypnotic trance that he cannot feel his limb and he will be quite unaware of the attitudes into which you may throw it [2]

All these cases whether spontaneous or experimental, show the absolute need of *guiding sensations* of some kind for the successful carrying out of a concatenated series of movements It is in fact easy to see that just as where the chain of movements is automatic (see above p 76) each later movement of the chain has to be discharged by the impression which the next earlier one makes in being executed so also where the chain is voluntary we need to know at each movement just *where we are in it* if we are to will intelligently what the next link shall be A man with no feeling of his movements might lead off never so well, and yet be sure to get lost soon and go astray [3] But patients like those described who get no kinæsthetic impressions can still be guided by the sense of sight Thus Strumpell says of his boy

One could always observe how his eye was directed first to the object held before him then to his own arm and how it never ceased to follow the latter during its

[1] Takacs Über d e Verspatung der Empfindungsleitung *Archiv f r Psychiat e* vol. x no 2 p 533 Concerning all such cases see the remarks made above on pp 586–87

[2] *Proceed ngs of Amer can Soc ety for Psychical Resea ch* p 95

[3] In reality the movement cannot even be *started* correctly in some cases without the ki æsthetic impression Thus Dr Strumpell relates ho v turning over the boy s hand made him bend the little finger instead of the forefinger when his eye was closed. Ordered to point e g towards the left with his left arm the arm was usually raised straight forward and then wandered about in grop ng uncertainty sometimes getting the right po tion a d then leaving it again Similarly w th the lower limbs If the p tient lyin in bed had immediately after the tying of his eyes to lay the left leg over the right it often happened that he moved it farther ove towards the left and that it lay over the side of the bed in apparently the most intolerably uncomfortable position The turning of the head too from right to left or towards certain objects known to the p tient only ensued correctly when the patient immed ately before his eye was bandaged specially refreshed his perception as to what the required movement was to be In another anæsthetic of Dr St umpell s (described in the same essay) the arm could not be moved *at all* unless the eyes were opened however energetic the volition The variations in these hysteric cases are great. Some patients cannot move the anæsthetic part *t all* when the eyes are clos d Others move it perfectly well and can even w ite continuous senic ces with the anæsthetic hand The

go e ned
cor ect
d fference
thetic im ges properly so called m y be v eak he says and their optical ima es insuff ciently powerful to supplement them with ut a f llip from sensation Janet s observation th t hysteric anæsthesias may carry amnes s with them would perfectly leg tim te M ller s supposition What we now want is a mi te exami ation of the i dividual cases Meanwh le Binet s article above referred to and Bastian s paper in *Bra n* for April 1887 conta n important discussions of the question In a later note I sh ll return to the subject ag in (see p 789)

entire mo ement. All his oluntary movements took place under the unremitting lead of the eye which as an indispensable guide was never untrue to its functions

So in the Landry case

With his eyes open he easily opposes the thumb to each of the other fingers with his eyes cl s d the movement of opposition occurs but the thumb only by chance meets the fi ger which it seeks With his eyes open he is able with ut hesitation to bring his two hands togeth r but when his eyes are closed his hands seek one an other in pace and only meet by chance.

In Charles Bell s well known old case of anæsthesia the woman could hold her baby safely in her arms only so long as she looked at it I have myself reproduced a similar condition in two hypnotic subjects whose arm and hand were made anæsthetic without being paralyzed They could write their names when looking but not when their eyes were closed The modern mode of teaching deaf mutes to articulate consists in making them attentive to certain laryngeal labial thoracic and other sensations the reproduction of which becomes a guide to their vocalization Normally it is the remoter sensations which we receive by the ear which keep us from going astray in our speech The phenomena of apha sia show this to be the usual case

This is perhaps all that need be said about the existence of passive sensations of mo ement and their indispensableness for our voluntary activity We may consequently set it down as certain that *whether or no there be anything else i the m nd at the moment when we consciously will a certain act a mental con ception made up of memory images of these sensations defin ng which special act it is must be there*

Now *s there anythi g else in the m nd when we will to do an act?* We must proceed in this chapter from the simpler to the more complicated cases My first thesis accordingly is that *the e need be nothi g else* and that *n perfectly s m ple vol ntary acts there is nothing else in the mind but the kinæsthetic idea th s defined of what the act is to be*

A powerful tradition in Psychology will have it that something additional to these images of passive sensation is essential to the mental determination of a v luntary act There must of course be a special current of energy going out from the brain into the appropriate muscles during the act and this outgoing current (it is supposed) must have in each particular case a feeling *sui generis* attached to it or else (it is said) the mind could never tell which particular cur re t the current to this muscle or the current to that one was the right one to Th f l f the curre t of outgo ng energy has received from Wundt the

ing all come after the movement s performance But wherever a movement is

Pr fesso Beaunis f nd that th accuracy with which certain ten sa g was n t l t when his vocal ds were made anæsth tic by ocain. H ncl des that th guiding sen sations h re are reside t in the laryngeal muscles th msel es. Th y are m ch m p b- ably in the ear (Bea nis *Le Sensatio interne* [889] p 53)

difficult and precise we become as a matter of fact acutely aware *in advance* of the amount and direction of energy which it is to involve One has only to play ten pins or billiards or throw a ball to catch his will in the act as it were of balancing *tentatively its possible efforts* and *ideally* rehearsing various muscular contractions nearly correct until it gets just the right one before it when it says Now go! This premonitory weighing feels so much like a succession of tentative sallyings forth of power into the outer world followed by correction just in time to avoid the irrevocable deed that the notion that *outgoing* nerve-currents rather than mere vestiges of *former passive sensibility accompany it* is a most natural one to entertain

We find accordingly that most authors have taken the existence of feelings of innervation as a matter of course Bain Wundt Helmholtz and Mach defend them most explicitly But in spite of the authority which such writers deservedly wield I cannot help thinking that they are in this instance wrong—that the discharge into the motor nerves is insentient and that *all our ideas of movement* including those of the effort which it requires as well as those of its direction its extent its strength and its velocity *are images of peripheral sensations either remote or resident in the moving parts or in other parts which sympathetically act with them in consequence of the diffusive wave*

A priori as I shall show there is no reason why there should be a consciousness of the motor discharge and there is a reason why there should not be such a consciousness The *presumption* is thus *against the existence of the feeling of innervation* and the burden of proving it falls upon those who believe in it If the positive empirical evidence which they offer prove also insufficient then their case falls to the ground and the feeling in question must be ruled out of court

In the first place then let me show that *the assumption of the feeling of innervation is unnecessary*

I cannot help suspecting that the scholastic prejudice that the effect must be already in some way *contained in* the cause has had something to do with making psychologists so ready to admit the feeling of innervation The outgoing current being the effect what psychic antecedent could contain or prefigure it better than a feeling of it? But if we take a wide view and consider the psychic antecedents of our activities at large we see that the scholastic maxim breaks down everywhere and that its verification in this instance would rather violate than illustrate the general rule In the diffusive wave in reflex action and in emotional expression *the movements which are the effects are in no manner* contained by anticipation in the stimuli which are their cause The latter are subjective sensations or objective perceptions which do not in the slightest degree resemble or prefigure the movements But we get them and presto! there the movements are! They are knocked out of us they surprise us It is just cause for wonder as our chapter on Instinct has shown us that such bodily conse[illegible] antecedents We explain the mystery *tant*
[illegible]
have grown into a uniform sequence Meanwhile why any state of consciousness *at all* should precede a movement we know not—the two things seem so

essentially discontinuous. But if a state of consciousness there must be why then it may for a ... ort of a state as another It is swallowin a cam ... on certain occa ... another occasion ... tion is an insufficient mental signal for the latter and to insist ... antecedent ... f the outgoin discharge.

No! for a ... ideas, as w ... motion are ... antecedents and determiners of the various currents down ... ces from the brain The question What *are* the antecedents and determinants? is a question of fact to be decided by whatever empirical evidence may be found

But before considerin the empirical evidence let me go on to show that there is a cer ain a priori *reason why the kinæsthetic images* OUGHT *to be the last psychic antecedents of the outgo g curre ts and why we should expect these currents to be insentient why in short the* soi-disant *feelings of nnervation should* NOT *xist*

As the feeling of heat, for example is the last psychi antecedent f sweating as the feeling f bright light is th t f the pupil co tracti n, as th sight smell f carrio is that of the mo ements of disgust, as th remembrance f blunder ma be that f blush, so h idea f m ement sensible effects might be th t f th m ement tself It is true tha the idea f sweatin will t commonly mak us sweat, that f blushin make us blush B t in certain nauseated tates the dea f mitin will make us mit and kind f sequence which is in this case realized nly exceptionally might be th rul w th the so-called oluntary muscles. It all d pends th nerv us connecti ns bet een th entres f ide tion and the dischargin paths. These may differ from on sort f centre t an ther T ... d ... noth Many persons ev blush t th

... p. 3) Th mm er t pe f excepti nal case is that in which th dea f th st ... t that f the effects. pro kes th effects. Thus w read f persons wh contract their pupils at will by tro gly imagining brilliant light. A gentleman ce nf rmed me ... no h I cann t recall wh he was, b t I have an impressi f his being medi...

... ideas f the m ... t sensible ffects sh uld be abl to in tigat th f rmer b t be t f rear w th the latt unless in xceptional indi iduals. Th fam us case f Col. T wnse d, wh could s p his heart t will, is well known. See on this wh matt D H. Tuke ... *Mind on the Body* chap xv § 3 also J Braid Ob... T ... *Hybernation* (185) Th latest eported case f oluntary co trol of the heart is by Dr S. A. Pease, in the *B st M dical nd Surgical J urnal*, M y 30, 1889.

It is a general principle in Psychology that consciousness deserts all processes where it can no longer be of use The tendency of consciousness to a minimum of complication is in fact a dominating law The law of parsimony in logic is only its best known case We grow unconscious of every feeling which is useless as a sign to lead us to our ends and where one sign will suffice others drop out and that one remains to work alone We observe this in the whole history of sense perception and in the acquisition of every art We ignore which eye we see with because a fixed mechanical association has been formed between our motions and each retinal image *Our motions are the ends of our seeing our retinal images the signals to these ends If each retinal image whichever it be* can suggest automatically a motion in the right direction what need for us to know whether it be in the right eye or the left? That knowledge would be superfluous complication So in acquiring any art or voluntary function The marksman ends by thinking only of the exact position of the goal the singer only of the per ... only of the point of the pole whose oscillations he must

the one movement fitted to bring the latter about Whilst they were ... thought of their means as well as their end the marksman of the position of his gun or bow or the weight of his stone the pianist of the visible position of the note on the keyboard the singer of his throat or breathing the balancer of his feet on the rope or his hand or chin under the pole But little by little they succeeded in dropping all this supernumerary consciousness and they became secure in their movements exactly in proportion as they did so

Now if we analyze the nervous mechanism of voluntary action we shall see that by virtue of this principle of parsimony in consciousness the motor discharge *ought* to be *devoid of sentience If we call the immediate psychic ante*cedent of a movement the latter s *mental cue* all that is needed for invariability of sequence on the movement s part is a *fixed connection* between each several mental cue and one particular movement For a movement to be produced with perfect precision it suffices that it obey instantly its own mental cue and nothing else and that this mental cue be incapable of awakening any other movement Now the *simplest* possible arrangement for producing voluntary movements would be t ... of the movement s *distinctive periph*
eral effects whet
the mental cues
with them For a ...
million distinct processes in the brain cortex (each corresponding to the idea or memory image of one movement) and a million distinct paths of discharge Everything would then be unambiguously determined and if the idea were right the movement would be right too Everything *after* the idea *might then be quite insentient and the motor discharge itself could be unconsciously per formed*

The partisans of the feeling of innervation however say that the motor discharge itself must be felt and that it and not the idea of the movement s distinc

[1] Prof Harless in an article which in many respects forestalls what I have to say (Der Apparat des Willens in Fichte s *Zeitschrift f Philos* vol 38 1861) uses the convenient word *Effectsbild* to designate these images

tive effects must
sacrificed and all
the interposition
the movement? Nothing on the score of economy or n i
just as many of them to associate a million ideas of movement with a million
m tor centres each with a specific *feeling of innervation* attached to its dis-
c with a million insentient motor
c
c
v

conscious discriminations between our
one pretends the shades of difference between feelings of innervation to be but
even were this not the case it is impossible to see how a mind with its idea
vaguely conceived could tell out of a lot of *Innervationsgefuhle* were they never
so sharply differentiated wh ch one fitted that idea exactly and which did not
A sharply conceived idea will on the other hand *directly* awaken a distinct
movement as easily as it will awaken a distinct feeling of innervation If feel
ings can go astray through vagueness surely the fewer steps of feeling there are
nterposed the more securely we shall act We ought then on *a priori* grounds
alone to regard the *Innervationsgefuhl* as a pure encumbrance and to presume
that the periphera

The presumptic
fend their exister
m ght be direct o
pla nly distinct f
body de ies to be
fo tunately it does not exist

The e ss a t trospect ve evidence of the feeling of innervation Wherever we
look for it and think we have grasped it we find that we have really got a periph
eral feeli g or image instead—an image of the way in which we feel when the in
nervation is over and the movement is in process of doing or is done Our idea
of raising our arm for example or of crooking our finger is a sense more or less
d of how the raised arm or the crooked finger feels There is no other mental
material out of which such an idea might be made We cannot possibly have any
idea of ou ears motion until our ears have mo ed and this is true of every

o ght to be to make us doubt the existence of the feeling in dispute Whoever

Th best mod rn stateme t I know is by J cc d *Des P* pieges s de latane du
ment (Paris, 864) p. 59

separate muscle at any rate cannot have its distinct feeling of innervation Wundt[1] who makes such enormous use of these hypothetical feelings in his psychologic construction of space is himself led to admit that they have no differences of quality but feel alike in all muscles and vary only in their degrees of intensity They are used by the mind as guides not of *which* movement but of *how strong* a movement it is mal ing or shall make But does not this virtually surrender their existence altogether?[2]

ing from the muscles themselves and their insertions from the vicinity of the joints, and from the general fixation of the larynx chest face and body in the phenomenon of effort objectively considered When a certain degree of energy of contraction rather than another is thought of by us this complex aggregate of

and the exact amount of resistance to be overcome

Let the reader try to direct his will towards a particular movement and then notice what *constituted* the direction of the will Was it anything over and above the notion of the different feelings to which the movement when effected would give rise? If we abstract from these feelings will any sign principle or means of orientation be left by which the will may innervate the right muscles with the right intensity and not go astray into the wrong ones? Strip off these

thought of certain digital sensations of certain alphabetic sounds of certain appearances on the paper and of no others which immediately precedes the motion of my pen

If I will to utter the word *Paul* rather than *Peter* it is the thought of my voice

pleteness and the act itself there is no room for any third order of mental phenomenon There is indeed the *fiat* the element of consent or resolve that the act shall ensue This doubtless to the reader s mind as to my own constitutes the essence of the voluntariness of the act This *fiat* will be treated of in detail further on It may be entirely neglected here for it is a constant coefficient affecting all voluntary actions alike and incapable of serving to distinguish them No one will pretend that its quality varies according as the right arm for example or the left is used

An anticipatory image then of the sensorial consequences of a movement plus (on certain occasions) the fiat *that these consequences shall become actual*

[1] Leidesdo f u Meynert s *V e teljsch f Psychiatrie* vol 1 no 1 secs 36–37 (1867) *Physiologische Psycholog e* 1st ed sec 316

[2] Professor Fouillée who defends th m in the *Revue philo opl ique* xxviii p 561 ff also admits (p 574) that they r th me whateve be the mo ement d that all our discrimination of *which* mo ement we are in ervatin is afferent consist g of sensations after and of sensory im ges bef re the act

is the only psychic state which introspection lets us discern as the forerunner of our voluntary acts There is no introspective evidence whatever of any still later or concomitant feelin attached to the efferent discharge The various degrees of difficulty with which the fiat is given form a complication of the utmost importance *to be discussed farther* on

Now the reader may still shake his head and say But can you seriously *mean* that all the wonderfully exact adjustment of my action s stren th to its ends is not a matter of outgo ng innervation? Here is a cannon ball and here a

[illegible] d ac urately I lift each from the table the ball not

the mind? or bein there is it credible that they should [illegible]

cately graduate the stimulation of the

work? Even so! I reply to both queries

foreshadowin of the sensory effects. Why [illegible]

through us if someone has filled the light seem ng box with sand before we try to lift it or has substituted for the cannon ball which we know a painted wooden imitation? *Surp ise* can only come from getting a sensation which differs from the one we expect But the truth is that when we know the objects well the very slightest difference from the expected wei ht will surprise us or at least attract ou not ce With

able by their app

and we set it [illegible]

Our expectation rises i e we think in a twinkling of a setting of the chest and t th a bracin of the back and a more v olent feeling in the arms Quicker than thought we have them and w th them the burden ascends into the air

inn rvate them Ferrier[2] has repeated and verified the observations They admit of no great precis on and too much stress should not be laid upon them either

Cf Sournau in *Rev philo phique* xxii p 454—Professo G E. Mull thus d scribes some f his expe me t h w ghts If ft liftin w ght f 3000 grams umb f t m dd nly g t w ght f nly 500 gr m t lift this I tt w ght is then lift d th locity wh ch trikes ry look so th t th eceptacl f th w ght with all t t t f fl h h p as f it ned th rm al g with t, d th rgy w th hich it is aised is sometimes so entı ly t f proporti t th w ght tself th t th en f h rec pt le sl g t po th tabl in sp t f th mechanical b tacles h h h result has t m A m palpable p f that th tr bl h is ro g dap tio f th m t impulse could t be gi en *Pfl ger' A hiv* xl p 47 Compa also p 57 and th q tati f m H ning th sam page.

A h fur P hiatrie iii, pp 6 8–35 B rnh rdt trangely en gh seems t think th t

up by Sachs in *Reichert nd D B u' A hiv* (874) pp 74–88 is, as f as th an t mical and physiological gr unds go, again th int d bt by M y *Zeit hrift f Biologi* 1

x. *Func ions f he B ain* p 8

way but at the very least they tend to show that no added delicacy would accrue to our perception from the consciousness of the efferent process even if it existed

Since there is no direct introspective evidence for the feelings of innervation is there any indirect or circumstantial evidence? Much is offered but on critical examination it breaks down Let us see what it is Wundt says that were our motor feelings of an afferent nature

> it *ought to be expected that they would increase and diminish with the amount of outer or inner work actually effected in contraction* This however is not the case, but *the strength of the motor sensation is purely proportional to the strength of the impulse* to movement which starts from the central organ innervating the motor nerves This may be proved by observations made by physicians in cases of morbid alteration in the muscular effect A patient whose arm or leg is half paralyzed so that he can only move the limb with great effort has a distinct feeling of this effort the limb seems to him heavier than before appearing as if weighted with lead he has therefore a sense of more work effected than formerly and yet the effected work is either the same or even less Only he must to get even this effect exert a stronger innervation a stronger motor impulse than formerly [1]

In complete paralysis also patients will be conscious of putting forth the greatest exertion to move a limb which remains absolutely still upon the bed and from which of course no afferent muscular or other feelings can come [2]

But Dr Ferrier in his *Functions of the Brain* (American ed pp 222–24) disposes very easily of this line of argument He says

> It is necessary however to exclude movements *altogether* before such an explanation [as Wundt's] can be adopted Now though the hemiplegic patient cannot move his paralyzed limb though he is conscious of trying hard *yet he will be found to be making powerful muscular exertion of some kind Vulpian has called attention* to the fact and I have repeatedly verified it that when a hemiplegic patient is desired to close his paralyzed fist in his endeavors to do so he unconsciously performs this action with the sound one It is in fact almost impossible to exclude such a source of complication and unless this is taken into account very erroneous conclusions as to the cause of the sense of effort may be drawn In the fact of muscular contraction and the concomitant centripetal impressions even though the action is not such as is desired the conditions of the consciousness *of effort exist without our being obliged to regard it as depending on central innervation or outgoing currents*
>
> It is however easy to make an experiment of a simple nature which will satisfactorily account for the sense of effort even when these unconscious contractions of the other side such as hemiplegics make are entirely excluded

[1] *Vorlesungen über Menschen und Thierseele* I p 222

[2] *In some instances we get an opposite result* Dr H Charlton Bastian (*British Medical Journal* 1869 p 461 note) says

> Ask a man whose lower extremities are completely paralyzed whether when he ineffectually wills to move either of these limbs he is conscious of an expenditure of energy in any *degree proportionate to that which he would have experienced if his muscles* had naturally responded to his volition He will tell us rather that he has a sense only of his utter powerlessness and that his volition is a mere mental act carrying with it no feelings of expended energy such as he is accustomed to experience when his muscles are in powerful action and from which *action and its consequences alone* as I think he can derive any adequate notion *of resistance*

If the reader will extend his right arm and hold his forefinger in the position required for pulling the trigger of a pistol, he may without actually moving his finger but by simply making believe, experience consciousness of energy put forth. Here, then, is a clear case of consciousness of energy without actual contraction of the muscles either of the one hand or the other and without any perceptible bodily strain. If the reader will again perform the experiment, and pay careful attention to the condition of his respiration, he will observe that his consciousness of effort coincides with a fixation of the muscles of his chest, and that in proportion to the amount of energy he feels he is putting forth, he is keeping his glottis closed and actively contracting his respiratory muscles. Let him place his finger as before, and *continue breathing* all the time, and he will find that however much he may direct his attention to his finger he will experience not the slightest trace of consciousness of effort until he has actually moved the finger itself and then it is referred locally to the muscles in action. It is only when this essential and ever-present respiratory factor is, as it has been, overlooked, that the consciousness of effort can with any degree of plausibility be ascribed to the outgoing current. *In the contraction of the respiratory muscles* there are the necessary conditions of centripetal impressions, and these are capable of originating the general sense of effort. When these active efforts are withheld, no consciousness of effort ever arises except in so far as it is conditioned by the local contraction of the group of muscles towards which the attention is directed, or by other muscular contractions called unconsciously into play in the attempt.

I am unable to find a single case of consciousness of effort which is not explicable in one or other of the ways specified. In all instances the consciousness of effort is conditioned by the actual fact of muscular contraction. That it is dependent on centripetal impressions *generated by the act of contraction*, I have endeavored to show. When the paths of the centripetal impressions or the cerebral centres of the same are destroyed, there is no evidence of a muscular sense. That the central organs for the apprehension of the impressions originating from muscular contraction are different from those which send out the motor impulse, has already been established. But when Wundt argues that this cannot be so because then the sensation would always keep pace with the energy of muscular contraction, he overlooks the important factor of *the fixation of the respiratory* muscles, which is the basis of the general sense of effort in all its varying degrees.

To these remarks of Ferrier's I have nothing to add.[1] Any one may verify them, and they prove conclusively that the consciousness of muscular exertion being impossible without movement effected *somewhere* must be an afferent and not an efferent sensation a consequence, and not an antecedent of the movement itself An idea of the amount of muscular exertion requisite to per

[1] Münsterberg's words may be added "In lifting an object in the hand I can discover no sensation of volitional energy I perceive in the first place slight tension about the head, but that this results from contraction in the head muscles, and not from feeling of the brain-discharge, is shown by the simple fact that I get the tension on the right side of the head when I move the right arm, whereas the motor discharge takes place in the opposite side of the brain. In maximal contractions of body and limb-muscles there occur as if it were to reinforce them, those peculiar contractions of the muscles of the face [especially frowning and clinching teeth] and those tensions of the skin of the head. These sympathetic

to the reader his most thorough refutation of the Innervations-gefühl-theory

form a certain movement can consequently be nothing other than an anticipa tory image of the movement s sensible effects

Driven thus from the body at large where next shall the circumstantial evi dence for the feeling of innervation lodge itself? Where but in the muscles of the eye from which small retreat it judges itself inexpugnable Nevertheless that fastness too must fall and by the lightest of bombardments But before trying the bombardment let us recall our general principles about optical verti go or illusory appearance of movement in objects

We judge that an object moves under two distinct sets of circumstances

1 When its image moves on the retina and we know that the eye is still

2 When its image is stationary on the retina and we know that the eye is moving In this case we feel that we *follow* the object

In either of these cases a mistaken judgment about the state of the eye will produce optical vertigo

If in case 1 we think our ey

ook ng at rushing water or through the w s of a moving railroad car or after turning on one s heel to giddiness The eyes without our intending to move them go through a series of involun tary rotations continuing those they were previously obliged to make to keep objects in view If the objects had been whirling by to our right our eyes when turned to stationary objects will still move slowly towards the right The retinal image upon them will then move like that of an object passing to the left We then try to catch it by voluntarily and rapidly rotating the eyes to the left when the involuntary impulse again rotates the eyes to the right continuing the apparent motion and so the game goes on (See above pp 511–12)

If in case 2 we think our eyes moving when they are in reality still we shall judge that we are following a moving object when we are but fixating a stead fast one Illusions of this kind occur after sudden and complete paralysis of spe cial eye muscles and the partisans of feelings of efferent innervation regard them as *experimenta crucis* Helmholtz writes [1]

When the external rectus muscle of the right eye or its nerve is paralyzed the eye can no longer be rotated to the right side So long as the patient turns it only to the nasal side it makes regular movements and he perceives correctly the posi tion of objects in the visual field So soon however as he tries to rotate it out wardly i e towards the right it ceases to obey his will stands motionless in the middle of its course and the objects appear flying to the right although position of eye and retinal image are unaltered

In such a case the exertion of the will is followed neither by actual movement of the eye nor by contraction of the muscle in question nor even by increased tension in it The act of will *produced absolutely no effect* beyond the nervous sys tem and yet we judge of the direction of the line of vision as if the will had exer cised its normal effects We believe it to have moved to the right and since the retinal image is unchanged we attribute to the object the same movement we have erroneously ascribed to the eye These phenomena leave no room for doubt that we only judge the direction of the line of sight by the effort of will with which

[1] *Phys olog sche Opt k* p 600

[2] The left and sound eye s h re suppo ed cove d If both eyes look at the same field there are double images wh ch still mor perplex the judgm nt The patient however learns to see correctly before many days or weeks a e ov r—W J

we tri e to change the position of our eyes. The e re al o certain weak feelings in ur eyelids and furthe ...nt f ns we feel a fatiguing strain in the mu cles But a the perception of direction. one, we apply t turn (

I

a recent authority of the effects o ...

When the n rve g in to a eye muscle e.g the external rectus f one side fall into a t te of pa esis th first esult is that the same ol tional stimulus which under rmal ci cumstances w uld ha e perhaps rotated the eye to ts extrem po tion o twa ds now is ompetent to effect only a moderate utward otatio say of o If now shutting the ound ye th pat ent looks at an object situated just so f r ut ds f m the pa etic eye that this latter must turn o in ord r to see it distinctly the pat ent will feel as f he had m ed t not nly o towards the side, b t to ts t eme l teral po t o fo the impulse of inn rvation equ t for bri ing t into w is a perf ctly o c ous t whil t the diminished state of on tract n of the pareti muscle l es f the p esent out of the ken of consciousness. The test pr posed by n Gra f f localizati n by the sen e of touch serves to rende ev dent the erro which the patient ow makes If we direct him to t uch ...idl the bj ct loo ed at with the f e-fin e of the hand of the same s de the line th ugh which the fing r m es will not be the line f ight directed o outward b t will approach mo e nearly to the extreme poss ble outward line of ision

A st ne-cutter with the external rectus of the left eye paralyzed will strike h hand instead of his chisel with his hammer until experience has taught him wisdom

It appears as if here the judgment of direction *could* only arise from the ex ces t e t ervation of the rectus when the object is looked at All the afferent feel n s must be identical with those experienced when the eye is sound and the judgment is correct The eyeball is rotated just 20 in the one case as in the ther the ima e falls on the same part of the retina the pressures on the eyeball and the tens ns of the kin and conjuncti a are identical There is only one feel ng which *can* ary and lead us to our mistake That feeling must be the effort wh ch the will makes moderate in the one case excessive in the other but in both cases an efferent feel ng pure and simple

Beautiful and clear as this easo in seems to be it is based on an incom plete in e tory of the afferent data The writers have all omitted to consider what is go ng on in the *othe* eye This is kept covered during the experiments t prevent double ima es and othe compl cat ons But f its condition under these circumstances be examined it will be found to present chan es which must result in strong afferent feelings And the taking account of these feel ings dem lishes in an instant all the conclusions which the authors from whom I ha e quoted base upon their supposed absence This I will now proceed to show

Al.red vo Graefe, in *H ndbuch der g sammt A genheilkund* L vi, pp. 8-

Prof sso G E Muller (*Zur Grundleg d P y h phy k* [8 3] p 3 8) was th first explain th ph me on after the manner d ocated in th te t Still unacquainted h his book I p blished my wn similar xplanat tw ears lat

Professor Mach in his w nderfully original little wo k *Bei r zur Anal der Empfind-*

Take first the case of complete paralysis and assume the right eye affected Suppose the patient desires to rotate his gaze to an object situated in the ex treme right of the field of vision As Hering has so beautifully shown both eyes move by a common act of innervation and in this instance both move towards the right But the paralyzed right eye stops short in the middle of its course the object still appearing far to the right of its fixation point The left sound eye meanwhile although covered continues its rotation until the ex treme rightward limit thereof has been reached To an observer looking at both eyes the left will seem to squint Of course this continued and extreme rotation produces afferent feelings of rightward motion in the eyeball which momentarily overpower the faint feelings of central position in the diseased and uncovered eye The patient feels by his left eyeball as if he were follow ing an object which by his right retina he perceives he does not overtake All the conditions of optical vertigo are here present the image stationary on the re- tina and the erroneous conviction that the eyes are moving

The objection that a feeling in the left eyeball ought not to produce a convic tion that the right eye moves will be considered in a moment Let us meanwhile turn to the case of simple paresis with apparent translocation on the field

Here the right eye succeeds in fixating the object but observation of the left eye will reveal to an observer the fact that it squints just as violently inwards as in the former case The direction which the finger of the patient takes in pointing to the object is the direction of this squinting and covered left eye As Graefe says (although he fails to seize the true import of his own observa tion) It appears to have been by no means sufficiently noticed how signifi cantly the direction of the line of sight of the secondarily deviating eye [i e of the left] and the line of direction of the pointed finger agree

The translocation would in a word be perfectly explained could we suppose that the sensation of a certain degree of rotation in the left eyeball were able to suggest to the patient the position of an object whose image falls on the right *retina alone* [1] *Can then a feeling in one eye be confounded with a feeling in the*

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ungen p 57 describes an artificial way of getting translocat n and explai s the eff ct like- wise by the feeling of innervation Turn your eyes he says as far as possible towards the left and press against the right sides of the orbits two large lumps of putty If you then try to look as quickly as possible towards the right this succeeds on ccount of the incompletely phcrical form of the yes only imperfectly and the objects consequently appear translo cated very c ns derably towards the right The *ba e will* to lo k rights ards g ves to all im ges n the ret na a greater *rightwards value* to express it shortly The experiment is at first surprising —I regret to say that I cannot myself make it succeed—I know not for wha
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false pe c pti n of o r eyeball s position quite ap rt f om the innervation feelings which Profe sor Mach supposes t coex st

[1] An Il ion in principle actly a alogous to that of the patient under discussion can be produc
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other? It most assuredly can For not only Donders and Adamuk by their vivi

or to the right We use them only to tell us where their objects lie It takes long practice directed specially to teach us on which retina the sensations severally fall Similarly the different sensations which arise from the positions of the eyeballs are used exclusively as signs of the position of objects

ing of a certain strain in the eyeballs, accompanied by the perception that just so far in front and so far to the right or to the left there is an object which we see So that a muscular process in one eye is as likely to combine with a retinal process in the other eye to effect a perceptive judgment as two processes in one eye are likely so to combine

Another piece of circumstantial evidence for the feelings of innervation is that adduced by Professor Mach as follows

If we stand on a bridge, and look at the water flowing beneath we usually feel ourselves at rest whilst the water seems in motion. Prolonged looking at the water however commonly has for its result to make the bridge with the observer and surroundings suddenly seem to move in the direction opposed to that of the water whilst the water itself assumes the appearance of standing still. The relative motion of the objects is in both cases the same and there must therefore be some adequate physiological ground why sometimes one sometimes the other part of them is felt to move. In order to investigate the matter conveniently I had the simple apparatus constructed which is represented in Fig. 55. An oil-cloth with a simple pattern is horizontally stretched over

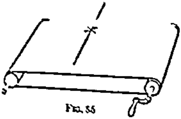


FIG. 55

(Fig. 55 ...) ... open ... appears also to move towards the right or left.

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false p rcept on f our eyeball s p s tion quite apart f om the innervation feelings which Profes r Mach s pposes to coexist

[1] An illu n in p nciple ex ctly an logo s to that of the pat ent u der d scussion can be produc d e perime t lly in a y e in way which He ng h s described i his *Lehre von B nocula n Sehen* pp 12–14 I w ll quot Helmholtz co t of it whi h is especi lly valuable as c ming fr m a believer n the *I n v ti n g f hl* L t the two eyes first look pa allel then let the right eye be closed wh lst the left st ll looks at the infinitely distant ob ject *a* The directions of both yes will thus emain unalte ed and *a* ill be seen in its right place Now accommodate the left eye for a point *f* [a needle in He g s experime t] lying

Similar chan es may be produced in the apparent motion of the moon and the clouds through which it shines by similarly altering the attention Such altera tions however in our conception of which part of the visual field is substan tive object and which part background seem to have no connection with feel ings of innervation I cannot therefore regard the observation of Prof Mach as any proof that the latter feelings exist

The circumstantial evidence for the feelin of innervation thus seems to break down like the introspective evidence But not only can we rebut experi ments intended to prove it we can also adduce experiments which disprove it A person who moves a limb voluntarily must innervate it in any case and if he feels the innervation he ou ht to be able to use the feeling to define what his limb is about even though the limb itself were anæsthetic If however the limb be totally anæsthetic it turns out that he does not know at all how much work it performs in its contraction—in other words he has no perception of the amount of innervation which he exerts A patient examined by Messrs Gley and Marillier beautifully showed this His entire arms and his trunk down to the navel were insensible both superficially and deeply but his arms were not par alyzed

ence f resistan and do s t even pe eive that anything s in his hand

M Gley in another place[2] quotes expe iments by Dr Bloch which prove that the sense which we ha e of our limbs position owes absolutely nothing to the feelin f nnervation put fo th Dr Bloch stood opposite the an le of a screen whose sides mad an angle of bout 90 and tried to place his hands symmetri

I w th int rp tat in th text t my frie d and f rm st d t, M E S D w wh m I set t bserv th phen men bef I had bserved t myself C cerning th vacillati ns in ur int rpretati f relati e m ti er retina and skin see b p 56
H Munst berg gi es dditi nal reas ns gainst th f ling f inn rv ti f which I will q te pl First, d as f m ment are all *fai t* deas resembling in this th copies f sensations in m m ry Wer they f lings f th t ing discharg they w uld be riginal tates f nsci usness t p es and ught by anal gy t be *vivid* lik ther riginal states.—Seco d unstriped muscles yield feelings in co tracting can th y be tract d t will, differing thus in t*w* peculiarities from th l tary muscles. Wh t

th msel es unf lt and why t might not b ing th tracti ns bo t. (*Die Willens handl g* pp 87–88)
[1] *Revue philo phiq* XXIII, p 442 [2] *Ibid* XX, p 604.

ders (each 2 metres long and 3 feet apart) and kept in uniform motion by the help of a crank Across the cloth and some 30 cm above it is stretched a string with a knot *x* which serves as a fixation point for the eye of the obser r If th h f llo

re moving contrary to the direction of the cloth whilst the latter seems to stand still This change in the mode of looking comes about in more or less time according to one s momentary disposition but usually it takes but a few seconds If one once un derstands the point one can make the two appearances alternate at will Every follow ing of the oil cloth makes the observer stationary every fixation of the knot or *in attention to the oil cloth so that its pattern becomes blurred* sets him in apparent motion [1]

Professor Mach proceeds to explain the phenomenon as follows

Moving objects exert as is well known a peculiar motor stimulation upon the eye they draw our attention and our look after them If the look really follows them we assume that they move But if the eye instead of following the moving objects remains steadfastly at rest it must be that the constant stimulus to motion which it receives is neutralized by an equally constant current of innervation flowing into its motor apparatus But this is just what would happen if the steadfastly fixated point were itself moving uniformly in the other direction and we were following it with our eyes When this comes about whatever motionless things are looked at must appear in motion [2]

The l not *x* the string we ourselves and all our stationary surroundings thus appear in movement according to Mach because we are constantly innervating our eyeballs to resist the *drag* exerted upon them by the pattern or the flowing waves I have myself repeated the observation many times above flowing streams but have never succeeded in getting the full illusion as described by Mach I gain a sense of the movement of the bridge and of my own body but the river never seems absolutely to stop it still moves in one direction whilst I float away in the other But be the illusion partial or complete a different ex planation of it from Professor Mach s seems to me the more natural one to adopt The illusion is said to cease when our attention being fully fixed on the moving oil cloth we perceive the latter for what it is and to recommence on the contrary when we perceive the oil cloth as a vaguely moving background behind an object which we directly fixate and whose position with regard to our own body is unchanged This however is the sort of consciousness which we have whenever we are ourselves borne in a vehicle on horseback or in a boat As we and our belongings go one way the *whole background* goes the other I should rather therefore explain Professor Mach s illusion as similar to the il lusion at railroad stations described above on page 511 The other train moves but it makes ours seem to move because filling the window as it does it stands for the time being as the total background So here the water or oil cloth stands for us as background *uberhaupt* whenever we seem to ourselves to be moving over it The relative motion felt by the retina is assigned to that one of its com ponents which we look at more in itself and less as a mere *repoussoir* This may be the knot above the oil cloth or the bridge beneath our feet or it may be on the other hand the oil cloth s pattern or the surface of the swirling stream.

[1] *Beit age zur A alyse de Empfi d gen* p 65 [2] *Ibid* p 68

On the whole then it seems as probable as anything can well be that these feelings of innervation do not exist If the motor cells are distinct structures they are as insentient as the motor nerve-trunks are after the posterior roots are cut. If they are not distinct structures but are only the last sensory cells h consciousness is that of kinæs-

those at

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of our c

of perip

nerves

that we gain at any rate simplicity and uniformity n ... Belief on the Emotions we found sensation to be a much richer thing than is commonly supposed and this chapter seems at this point to fall into line with those Then as for sensationalism being a degrading belief which abolishes all inward originality and pontaneity there is this to be said that the advocates of inward spontaneity may be turning their backs on ts real citadel when they make a fight, on its b h If f r the consciousness of energy put forth in the out going discharge Let

movements be of se

and espousing of one

the reality for me there is ample scope for our inward initiative to be shown Here it seems to me the true line between the passive materials and the ac tivity of the pirit should be drawn It is certainly false strategy to draw it be tween such ideas as are connected with the out oing and such as are connected with the incoming neural wave

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confesses

stances.

f ct rs

nean hile f th length sev rally tra ersed by th tw hands is mainly based as cn esu m ns th closed eyes usually ar (se Lo b wn earlier pape *U t uck gen uber d F klr m der H nd* in *Pfl ger' A hi* XLI, p 7) pon th pparent velocity and durati f th m eme t. Th duratio is th sam f both hands, sin th m ments begin and d sim ltan usly Th locities f th tw hands d th experim tal co d t ns lm t impossibl f compariso It is well kn wn h w imperf ct discrimin

sign is th duratio hich w ld lead us t infer th eq ality f th tw m ements. W conseq ently deem th m qual, th gh u t d c) in m t centres keeps them f m being so

This is by means an implausibl pini n. See p 4

Main d Biran R g C llard, Si J hn H rschel, D Carpenter D Martin all seem to posit f rce-sense by which in becoming ware f an ter resistance t ur will, we are ta ght th existence f an ter w ld I h ld that every peripheral sensati n gi es us an ter w ld. An insect crawling n ur skin gi es us as tward an impression as

cally or so that both should fall on corresponding spots of the two screen sides which were marked with squares for the purpose The average error being noted one hand was then passively carried by an assistant to a spot on its screen side and the other actively sought the corresponding spot on the opposite side The accuracy of the correspondence proved to be as great as when both arms were innervated voluntarily showing that the consciousness of innervation in the first of the two experiments added nothing to the sense of the limbs position Dr Bloch then tried pressing a certain number of pages of a book between the thumb and forefinger of one hand to press an equal number between the same

the former case had no effect upon the consciousness of the movement made so far as its spatial character at any rate was concerned [1]

[1] Herr Sternberg (*Pfluger's Archiv* xxxvii p 1) thinks that he proves the feeling of innervation by the fact that when we have willled to make a movement we generally think

ous place that the illusion is in all these cases due to the inveterate association of ideas Normally our will to move has always been followed by the sensation that we *have* moved except when the simultaneous sensation of an external resistance was there The result is *that where we feel no external resistance and the muscles and tendons tighten* the invariably associated idea is intense enough to be hallucinatory In the experiment with the teeth the resistance custom We d not *close our teeth on a* e do so we imagine the hab tual — not continue to feel them as if they were still there and can moreover give themselves the feeling of moving them at will *The life long sensorial associate of the dea of working ones t es* non mov ment can man thinks that his

own made after my text was written others Loeb s facts are these (*Pfluge* ... surface and if with our hands *at d ffere t l e ghts* we *s multaneously* m ke with them what seem to us equally extensive movements that movement al ways turns out re lly horter which is made with the arm whose muscles (*in rtue of the arm s pos tion*) *are already* the more contracted The same result ensues whe the arms are late ally unsymmetrical Loeb assumes that both arms co tract by virtue of a common innervation but that although ... *ff ct e uno the more contracted a m our f el ng of its*

successive movements? and especially why not when bot hand ... the same level but *o e of them is we gl ted?* A we ghted hand s ly requires a stro g r innervation than an *unweighted o e to move an equal d stance upwards* and yet as Loeb

ment of the end whenever we are preoccupied with much ideal consciousness of the means. We walk a beam the better the less we think of the position of our feet upon it. We pitch or catch, we shoot or chop the better the less tactile and muscular (the less resident) and the more exclusively optical (the more remote) our consciousness is. Keep your eye on the place aimed at, and your hand will fetch it; think of your hand, and you will very likely miss your aim. Dr Southard found that he could touch a spot with a pencil-point more accurately with a *visual than with a tactile mental cue*. In the former case he looked at a small object and closed his eyes before trying to touch it. In the latter case he *placed* it with closed eyes, and then after removing his hand tried to touch it again. The average error with touch (when the results were most favorable) was 17.13 mm. With sight it was only 12.37 mm.—All these are plain results of introspection and observation. By what neural machinery they are made possible we need not at this present stage inquire.

In Chapter XVIII we saw how enormously individuals differ in respect to their mental imagery. In the type of imagination called *tactile* by the French authors, it is probable that the kinæsthetic ideas are more prominent than in my account. We must not expect too great a uniformity in individual accounts, nor wrangle overmuch as to which one truly represents the process.

Bowditch and Southard in the *Journal of Physiology*, vol. III, No. 3. It was found in these experiments that the maximum of accuracy was reached when two seconds of time elapsed between locating the object by eye or hand and starting to touch it. When the mark was located with *one* hand, and the *other* hand had *to touch it*, the error was considerably greater than when the same hand both located and touched it.

The same caution must be shown in discussing pathological cases. There are remarkable discrepancies in the effects of peripheral anæsthesia upon the voluntary power. Such cases as I quoted in the text (p. 69) are by *no means the only type*. *In those cases the patients* could move their limbs accurately when the eyes were open, and inaccurately when they were shut. In other cases, however the anæsthetic patients *exact mov*[illegible] *their limbs at all* when the eyes are shut. (For reports of two such cases see Bastian in *Brain*, and Binet in *Rev. Philos.* XXV p. 478.) M. Binet explains these (hysterical) cases as requiring the dyna-

[illegible]

[illegible]ey.—There is still [illegible] class of cases in which the limbs have lost all sensibility even of movements passively imprinted, but in which voluntary movements can be accurately executed even when the eyes are closed. MM. Binet and Féré have reported some of these interesting cases, which are found amongst the hysterical hemianæsthetics. They can, for example, write accurately at will, although their eyes are closed and they have no feeling of the writing taking place; and many of them do not know when it begins or stops. Asked to write repeatedly the letter a and then say how many times they have written it, some are able to assign the number and some are not. Some of them admit that they are guided by visual imagination of what is being done. (Cf. *Archives de Physiologie*, Oct., '88, pp. 363–[illegible].) Now it would seem at first sight that feelings of outgoing innervation must exist in these cases and be kept account of. There are no other guiding impressions, either immediate or remote, of which the patient is conscious; and unless feelings of innervation be there, the writing would seem miraculous. But if such feelings are present in these cases, and suffice to direct accurately the succession of movements, why do they not suffice in those other anæsthetic cases in which motion becomes disorderly when the eyes are closed? *Innervation* is there, or there would be no movement; why is the *feeling* of the innervation gone? The truth seems to be, as M. Binet supposes (*Rev. Philos.*, XXIII, p. 479), that these cases are not arguments for the feeling of innervation. They are pathological curiosities and the patients are not really anæsthetic, but are victims of that curious dissociation

If the ideas by which we discriminate between one movement and another at the instant of deciding in our mind which one we shall perform are always of sensorial origin then the question arises Of which sensorial order need they be? It will be remembered that we distinguished two orders of kinæsthetic impression the *remote* ones made by the movement on the eye or ear or distant skin etc and the *resident* ones made on the moving parts themselves muscles joints etc Now do resident images exclusively form what I have called the mental cue or will remote ones equally suffice?

There can be no doubt whatever that the mental cue may be either an image of the resident or of the remote kind Although at the outset of our learning a movement it would seem that the resident feelings must come strongly before consciousness (*cf* p 768) later this need not be the case The rule in fact, would seem to be that they tend to lapse more and more from consciousness and that the more practised we become in a movement the more remote do the ideas become which form its mental cue What we are *interested* in is what sticks in our consciousness everything else we get rid of as quickly as we can Our resident feelings of movement have no substantive interests for us at all, as a rule What interest us are the ends which the movement is to attain Such an end is generally an outer impression on the eye or ear or sometimes on the skin nose or palate Now let the idea of the end associate itself definitely with the right motor innervation and the thought of the innervation s *resident* effects will become as great an encumbrance as we formerly concluded that the feeling of the innervation itself would be The mind does not need it the end alone is enough

The idea of the end then tends more and more to make itself all sufficient Or at any rate if the kinæsthetic ideas are called up at all they are so swamped in the vivid kinæsthetic feelings by which they are immediately overtaken that we have no time to be aware of their separate existence As I write I have no anticipation as a thing distinct from my sensation of either the look or the digital feel of the letters which flow from my pen The words chime on my mental *ear* as it were before I write them but not on my mental eye or hand This comes from the rapidity with which often repeated movements follow on their mental cue An end consented to as soon as conceived innervates directly the centre of the first movement of the chain which leads to its accomplishment and then the whole chain rattles off *quasi* reflexly as was described on pp 75–76

The reader will certainly recognize this to be true in all fluent and unhesitating voluntary acts The only special fiat there is at the outset of the performance A man says to himself I must change my shirt and involuntarily he has taken off his coat and his fingers are at work in their accustomed manner on his waistcoat buttons etc or we say I must go downstairs and ere we know it we have risen walked and turned the handle of the door —all through the idea of an end coupled with a series of guiding sensations which successively arise It would seem indeed that we fail of accuracy and certainty in our attain

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a hundred pounds weighing on our back —I have read M A Bertrand s criticism of my views (*La Psychologie de l'Effort* 1889) but, as he seems to think that I deny the *feeling* of effort altogether I can get no profit from it despite his charming way of saying things

day and which incomin sensations instigate so immediately that it is often difficult to decide whether not to call them reflex rather than voluntary acts. We have seen in Chapter IV that the intermediary terms of an habitual series of acts leadin to an end are apt to be of this *quasi*-automatic sort. As Lotze says

We see in writing or piano-playing a great number of very complicated movements following quickly one upon the other the instigative representations of which remained scarcely a second in consciousness certainly not long enough to awaken any other volition than the general one of resigning o e s self without reserve to the passing over f rep esentati n into acti n. All the cts f our daily life happen in this wise Our standing p walking talking all this never demands a distinct impulse of the will, but is adequately brought abo t by the pure flux of thought.[1]

In all this the determining condition of the unhesitating and resistless sequence of the act seems to be *the absence of any conflicting notion in the mind* Either there is nothing else at all in the mind or what is there does not conflict. The hypnotic subject realizes the former condition. Ask him what he is thinkin about and ten to one he will reply Nothing The consequence is that he both believes everything he is told and performs every act that is suggested. The suggestion may be a vocal command or it may be the performance before him of the movement required Hypnotic subjects in certain conditions repeat whatever they hear you say and imitate whatever they see you do Dr Fere says that certain waking persons of neurotic type if one repeatedly close and open one s hand before their eyes soon begin to have corresponding feelings in their own fingers and presently begin irresistibly to execute the movements which they see. Under these conditions of preparation" Dr Fere found that his subjects could squeeze the hand-dynamometer much more stron ly than when abruptly in ited to do so A few *passive* repetitions of a movement will enable many enfeebled patients to execute it actively with greater strength. These observations beautifully show how the mere quickening of kinæsthetic ideas is equivalent to a certain amount of tension towards discharge in the centres.

We know what t is to get out of bed on a f eezing morning in a room without a fire and how the very ital principle within us protests against the ordeal. Probably most persons have lain on certain mornings for an hour at a time unble to brace themsel es to the resolve. We think how late we shall be how the duties of the day will suffer we say "I *must* get up this is ignominious etc but still the warm couch feels too delicious the cold outside too cruel and resolution faints away and postpones itself again and again just as it seemed on the erge of bursting the resistance and passing over into the decisive act. Now how do we *ever* get up under such circumstances If I may generalize from my

[1] *Medicinische Psychologie* p. 93. In his admirably cute chapter on the Will this uthor has most especially maintained th positi tha what w call muscular exertio is an afferent and not an efferent feeling "W must affirm universally that in the muscular feeling we are not sensible of the *force* its way to produce an effect, b t only of the *su erance* already produced in our mo able rgans, the muscles, after the force has, in manner unobservable by us, exerted upo them its causality" (p 3) How ften the battles f psychology have t be fought over again, each time with heavier armies and bigger trains, though not always w h such able generals Ch. Fer *Sensation et mou ment* (53) chs ter iii.

I trust that I have now made clear what that idea of a movement' is which must precede it in order that it be voluntary It is not the thought of the inner vation which the movement requires It is the anticipation of the movement s sensible effects resident or remote and sometimes very remote indeed Such anticipations to say the least determine *what* our movements shall be I have spoken all along as if they also might determine *that* they shall be This no doubt has disconcerted many readers for it certainly seems as if a special fiat or consent to the movement were required in addition to the mere conception of it in many cases of volition and this fiat I have altogether left out of my account This leads us to the next point in the psychology of the Will It can be the more easily treated now that we have got rid of so much tedious prelimi nary matter

Ideo motor Action

The question is this *Is the bare idea of a movement s sensible effects its sufficient mental cue* (p 774), *or must there be an additional mental antecedent in the shape of a fiat decision consent volitional mandate or other synony mous phenomenon of consciousness before the movement can follow?*

I answer Sometimes the bare idea is sufficient but sometimes an additional conscious element in the shape of a fiat mandate or express consent, has to intervene and precede the movement The cases without a fiat constitute the more fundamental because the more simple variety The others involve a special complication which must be fully discussed at the proper time For the present let us turn to *ideo motor action* as it has been termed or the sequence of movement upon the mere thought of it as the type of the process of volition

Wherever movement follows *unhesitatingly and immediately* the notion of it in the mind we have ideo motor action We are then aware of nothing between the conception and the execution All sorts of neuro muscular processes come between of course but we know absolutely nothing of them We think the act and it is done and that is all that introspection tells us of the matter Dr Car penter who first used I believe the name of ideo motor action placed it if I mistake not among the curiosities of our mental life The truth is that it is no curiosity but simply the normal process stripped of disguise Whilst talking I become conscious of a pin on the floor or of some dust on my sleeve Without interrupting the conversation I brush away the dust or pick up the pin I make no express resolve but the mere perception of the object and the fleeting notion of the act seem of themselves to bring the latter about Similarly I sit at table after dinner and find myself from time to time taking nuts or raisins out of the dish and eating them My dinner properly is over and in the heat of the con versation I am hardly aware of what I do but the perception of the fruit and the fleeting notion that I may eat it seem fatally to bring the act about There is certainly no express fiat here any more than there is in all those habitual goings and comings and rearrangements of ourselves which fill every hour of the

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splitting off of one part of their consciousness from the rest which we are just beginning to understand thanks to Messrs Janet Binet and Gurney and in which the split-off part (in this case the kinæsthetic sensations) may nevertheless remain to produce its usual effects. Compare what was said above p 770

there is no express fiat needed when the conditions are simple the reader ought now to be convinced. Lest, however, he should still share the common prejudice that voluntary action without "exertion of will-power" is Hamlet with the Prince's part left out, I will make a few farther remarks. The first point to start from in understanding voluntary action, and the possible occurrence of it with no fiat or express resolve, is the fact that consciousness is *in its very nature impulsive*.* We do not have a sensation or a thought and then have to *add* something dynamic to it to get a movement. Every pulse of feeling which we have is the correlate of some neural activity that is already on its way to instigate a movement. Our sensations and thoughts are but cross-sections, as it were, of currents whose essential consequence is motion, and which no sooner run in at one nerve than they run out again at another. The popular notion that mere consciousness as such is not essentially a forerunner of activity, that the latter must result from some superadded "will-force," is a very natural inference from those special cases in which we think of an act for an indefinite length of time without the action taking place. These cases, however, are not the norm; they are cases of inhibition by antagonistic thoughts. When the blocking is released we feel as if an inward spring were let loose, and this is the additional impulse or fiat upon which the act effectively succeeds. We shall study anon the blocking and its release. Our higher thought is full of it. But where there is no block, there is naturally no hiatus between the thought-process and the motor discharge. *Movement is the natural immediate effect of feeling, irrespective of what the quality of the feeling may be. It is so in reflex action, it is so in emotional expression, it is so in the voluntary life.* Ideo-motor action is thus no paradox, to be softened or explained away. It obeys the type of all conscious action, and from it one must start to explain action in which a special fiat is involved.

It may be remarked in passing, that the inhibition of a movement no more involves an express effort or command than its execution does. Either of them may require it. But in all simple and ordinary cases, just as the bare presence of one idea prompts a movement, so the bare presence of another idea will prevent its taking place. Try to feel as if you were crooking your finger, whilst keeping it straight. In a minute it will fairly tingle with the imaginary change of position; yet it will not sensibly move, because *its not really moving* is also a part of what you have in mind. Drop *this* idea, think of the movement purely and simply, with all brakes off; and, presto! it takes place with no effort at all.

A waking man's behavior is thus at all times the resultant of two opposing neural forces. With unimaginable fineness some currents among the cells and fibres of his brain are playing on his motor nerves, whilst other currents, as unimaginably fine, are playing on the first currents, damming or helping them, altering their direction or their speed. The upshot of it all is, that whilst the cur-

* I abstract here from the fact that a certain intensity of the consciousness is required for its impulsiveness to be effective in a complete degree. There is an inertia in the motor processes as in all other natural things. In certain individuals, and at certain times (disease, fatigue), the inertia is unusually great, and we may then have ideas of action which produce no visible act, but discharge themselves into merely nascent dispositions to activity or into emotional expression. The inertia of the motor parts here plays the same rôle as is elsewhere played by antagonistic ideas. We shall consider this restrictive inertia later on; it obviously introduces no essential alteration into the law which the text lays down.

own experience we more often than not get up without any struggle or decision at all We suddenly find that we *ha e* got up A fortunate lapse of consciousness occurs we forget both the warmth and the cold we fall into some revery connected with the day s life in the course of which the idea flashes across us

ately its appropriate motor effects It was our acute consciousness of both the warmth and the cold during the period of struggle which paralyzed our activity then and kept our idea of rising in the condition of *wish* and not of *will* The moment these inhibitory ideas ceased the original idea exerted its effects

This case seems to me to contain in miniature form the data for an entire psychology of volition It was in fact through meditating on the phenomenon in my own person that I first became convinced of the truth of the doctrine which these pages present and which I need here illustrate by no farther examples [1] The reason why that doctrine is not a self evident truth is that we have so many ideas which *do not* result in action But it will be seen that in every such case without exception that is because other ideas simultaneously present rob them of their impulsive power But even here and when a movement is inhibited from *completely* taking place by contrary ideas it will *incipiently* take place To quote Lotze once more

> The pectator accompanies the throwing of a billiard ball or the thrust of the swordsman with slight movements of his arm the untaught narrator tells his story with many gesticulations the reader while absorbed in the perusal of a battle scene feels a slight tension run throu h his muscular system keeping time as it were with the actions he is reading of These results become the more marked the more we are absorbed in thinking of the movements which suggest them they grow fainter exactly in proportion as a complex consciousness under the dominion of a crowd of other representations withstands the passing over of mental contemplation into outward action

The willing game the exhibitions of so called mind reading or more properly muscle reading which have lately grown so fashionable are based on this incipient obedience of muscular contraction to idea even when the deliberate intention is that no contraction shall occur

We may then lay it down for certain that *every representation of a movement awakens in some degree the actual movement which is its object and awakens it in a maximum degree whenever it is not kept from so doing by an antagonistic representation present simultaneously to the mind*

The express fiat or act of mental consent to the movement comes in when the neutralization of the antagonistic and inhibitory idea is required But that

[1] Professor A Bain (*The Se ses d the I tellect* pp 336–48) and Dr W B Carpenter (

you w ll then f rce her to w ite it let her hold a pencil nd do you you self hold her hand She will then probably trace the n me involuntarily believing th t you are forcing her to do it

rium is unreached that testing our reasons not obeying them is still the order of the day and that we must wait awhile patiently or impatiently until our mind is made up for good and all This inclining first to one then to another future both of which we represent as possible resembles the oscillations to and fro of a material body within the limits of its elasticity There is inward strain b t no outward rupture And this condition plainly enough is susceptible of indefinite continuance as well in the physical mass as in the mind If the elasticity give way however if the dam ever do break, and the currents burst the crust, vacillation is over and decision is irrevocably there.

The decision may come in either of many modes. I will try briefly to sketch the most characteristic types of it merely warning the reader that this is only an introspective account of symptoms and phenomena and that all questions of causal agency whether neural or spiritual are relegated to a later page

The particular reasons for or against action are of course infinitely various in concrete cases. But certain motives are more or less constantly in play One of these is *impatie ce of the deliberative state* or to express it otherwise proneness to act or to decide merely because action and decision are as such agreeable and relieve the tension of doubt and hesitancy Thus it comes that we will often take any course whatever which happens to be most vividly before our minds at the moment when this impulse to decisive action becomes extrem

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Another constant component of the web of motivation is the impulse to persist in a decision once made There is no more remarkable difference in human character than that between resolute and irresolute natures Neither the physiological nor the physical grounds of this difference have yet been analyzed Its symptom is that whereas in the irresolute all decisions are provisional and liable to be reversed in the resolute they are settled once for all and not disturbed again. Now into every one s deliberations the representation of one alternative will often enter with such sudden force as to carry the imagination with itself exclusively and to produce an apparently settled decision in its own favor These premature and spurious decisions are of course known to everyone. They

to the more genuine reasons why it should not be revoked or if provisionally revoked why it should be made again How many of us persist in a precipitate course which but for a moment of heedlessness we might never have entered upon simply because we hate to change our mind

rents must always end by being drained off through *some* motor nerves they are drained off sometimes through one set and sometimes through another and sometimes they keep each other in equilibrium so long that a superficial observer may think they are not drained off at all Such an observer must remember however that from the physiological point of view a gesture an expression of the brow or an expulsion of the breath are movements as much as an act of locomotion is A king s breath slays as well as an assassin s blow and the outpouring of those currents which the magic imponderable streaming of our ideas accompanies need not always be of an explosive or otherwise physically conspicuous kind

Action after Deliberation

We now in position to describe *what happens in deliberate action* or

prompt a movement some of the additional considerations howev [illegible] are present to consciousness block the motor discharge whilst others on the contrary, solicit it to take place The result is that peculiar feeling of inward unrest known as *indecision* Fortunately it is too familiar to need description for to describe it would be impossible As long as it lasts with the various objects before the attention we are said to *deliberate* and when finally the original suggestion either prevails and makes the movement take place or gets definitely quenched by its antagonists we are said *to decide* or *to utter our voluntary fiat* in favor of one or the other course The reinforcing and inhibiting ideas meanwhile are termed the *reasons* or *motives* by which the decision is brought about

The process [illegible] ns endless degrees of complication At every moment of it o[illegible] existence of th[illegible] Of this object [illegible] certain parts stand out more or less sharply in the foreground at one mom[illegible] and at another moment other parts in consequence of the oscillations of our attention, and of the associative flow of our ideas But no matter how sharp the foreground reasons may be or how imminently close to bursting through the dam and carrying the motor consequences their own way the background however dimly felt is always there and its presence (so long as the indecision actually lasts) serves as an effective check upon the irrevocable discharge The deliberation may last for weeks or months occupying at intervals the mind The motives which yesterday seemed full of urgency and blood and life to-day feel strangely weak and pale and dead But as little to day as to-morrow is the question finally resolved Something tells us that all this is provisional that the weakened reasons will wax strong again and the stronger weaken that equilib

[illegible] con enience sake The reader who has

shall not h s tate from time to time [illegible] though I believe it to be

rium is unreached that testing our reasons not obeying them is still the order of the day and that we must wait awhile patiently or impatiently until our mind is made up for good and all. This inclining first to one then to another future both of which we represent as possible resembles the oscillations to and fro of a material body within the limits of its elasticity There is inward strain but no outward rupture And this condition plainly enough is susceptible of indefinite continuance as well in the physical mass as in the mind If the elasticity give way however if the dam ever do break and the currents burst the crust, vacillation is over and decision is irrevocably there.

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The particular reasons for or against action are of course infinitely various in concrete cases. But certain motives are more or less constantly in play One of these is *impatience of the deliberative state* or to express it otherwise proneness to act or to decide merely because action and decision are, as such agreeable and relieve the tension of doubt and hesitancy Thus it comes that we will often take any course whatever which happens to be most vividly before our minds at the moment when this impulse to decisive action becomes extreme.

Against this impulse we have the *dread of the irrevocable* which often engenders a type of character incapable of prompt and vigorous resolve except perhaps when surprised into sudden activity These two opposing motives twine round whatever other motives may be present at the moment when decision is imminent, and tend to precipitate or retard it. The conflict of these motives so far as they alone affect the matter of decision is a conflict as to *when* it shall occur One says now the other says not yet.

Another constant component of the web of motivation is the impulse to persist in a decision once made. There is no more remarkable difference in human character than that between resolute and irresolute natures Neither the physiological nor the physical grounds of this difference have yet been analyzed. Its symptom is that whereas in the irresolute all decisions are provisional and liable to be reversed in the resolute they are settled once for all and not disturbed again. Now into every one s deliberations the representation of one alternative will often enter with such sudden force as to carry the imagination with itself exclusively and to produce an apparently settled decision in its own favor These premature and spurious decisions are of course known to everyone They often seem ridiculous in the light of the considerations that succeed them But it cannot be denied that in the resolute type of character the accident that one of them has once been made does afterwards enter as a motive additional to the more genuine reasons why it should not be revoked or if provisionally revoked why it should be made again How many of us persist in a precipitate course which but for a moment of heedlessness we might never have entered upon, simply because we hate to change our mind

Five Types of Decision

Turning now to the form of the decision itself we may distinguish four chief types The first may be called *the reasonable type* It is that of those cases in which the arguments for and against a given course seem gradually and al most insensibly to settle themselves in the mind and to end by leaving a clear balance in favor of one alternative which alternative we then adopt without effort or constraint Until this rational balancing [illegible] nsummated we have a calm feeling [illegible] eps action [illegible] ing rightly [illegible] e subject by furth [illegible] and that the [illegible] tter be settled [illegible] bt to assur ance [illegible] *ue us appear* [illegible] have [illegible] ing of [illegible] covery th [illegible] act unhesi [illegible]

[illegible] t in point The moment we [illegible] ich lets us apply some principle of action which is a fixed and stable part of our Ego our state of doubt is at an end Persons of au thority who have to make many decisions in the [illegible] hem a set of heads of classification [illegible] under these [illegible] It is where [illegible] *thout precedent to which consequently* [illegible] ried maxim will apply that we feel most at a loss and are dis tressed at the indeterminateness of our task As soon however as we see our way to a familiar classification we are at ease again *In action as in reasoning then the great thing is the quest of the right conception* The concrete dilem mas do not come to us with labels gummed upon their backs We may name them by many names The wise man is he who succe [illegible] ng the name which suits the needs of th [illegible] character [illegible] decide about [illegible] *detrimental*

In the next two types of d[illegible] the final fiat occurs before the evidence is [illegible] mount and authoritative reason for either [illegible] of a Good and th [illegible]

In the *second type* of case our feeling is to a certain extent that of lettin, our selves drift with a certain indifferent acquiescence in a direction accidentally determined *from without* with the conviction that after all we might as well stand by this course as by the other and that things are in any event sure to turn out sufficiently right

In the *third ty e* the determination seems equally accidental but it comes from within and not from without. It often happens when the absence of im perati e principle is perplexing and suspen e distracting that we find ourselves acting as it were automatically and as if by a pontaneous discharge of our nerves, in the direction of one of the horns of the dilemma But so exciting is this sense of motion after our intolerable pent up state that we eagerly throw our selves into it. Forward now! we inwardly cry though the heavens fall. This reckless and exultant espousal of an energy so little premeditated by us that we feel rather like passive spectators cheering on the display of some ex traneous force than like voluntary agents is a type of decision too abrupt and tumultuous to occur often in humdrum and cool blooded natures But it is probably frequent in persons of strong emotional endowment and unstable or vacillating character And in men of the world shaking type the Napoleons Luthers, etc., in whom tenacious passion combines with ebullient activity when by any chance the passion s outlet has been dammed by scruples or apprehensions, the [illegible] s probably often of this catastrophic kind The flood breaks qu[illegible] is quite sufficie[illegible] mood of mind. [illegible] the energy just [illegible]

There is a *fo*[illegible] as the third form does. [illegible] or some inexplicable inward charge *we suddenly pass f om the easy and care* [illegible] *mood or poss bly* the other way The whole scale

[illegible] fantastic notions lose their mot e pow[illegible] many fold The consequence is an instant abandonment of the more trivial projects with which we had been dallyin and an instant practical acceptance of the mo e grim and earnest alternative which till then could not extort our mind s consent All those changes of heart awakenings of conscience etc. which make ew men of so many of us may be classed unde this head The character abruptly rises to another level, and deliberation comes to an immediate end

I the *fifth and final type* of decis on the feeling that the evidence is all in

[illegible]

the logical reason which, taken alone seems powerless to make the act discharge in the latter by a kind of creati e contribution of something instead of

My attentio was first mphatically called to this class f decisions by my colleague, Professo C. C. E erett.

a reason which does a reason s work The slow dead heave of the will that is felt in these instances makes of them a class altogether different subjectively from all the three preceding classes What the heave of the will betokens metaphysically what the effort might lead us to infer about a will power distinct from motives are not matters that concern us yet Subjectively and phenomenally, the *feeling of effort* absent from the former decisions accompanies these Whether it be the dreary resignation for the sake of austere and naked duty of all sorts of rich mundane delights or whether it be the heavy resolve that of two mutually exclusive trains of future fact both sweet and good and with no strictly objective or imperative principle of choice between them one shall for evermore become impossible while the other shall become reality it is a desolate and acrid sort of act an excursion into a lonesome moral wilderness If examined closely its chief difference from the three former cases appears to be that in those cases the mind at the moment of deciding on the triumphant alternative dropped the other one wholly or nearly out of sight whereas here both alternatives are steadily held in view and in the very act of murdering the vanquished possibility the chooser realizes how much in that instant he is making himself lose It is deliberately driving a thorn into one s flesh and the sense of *inward effort* with which the act is accompanied is an element which sets the fourth type of decision in strong contrast with the previous three varieties and makes of it an altogether peculiar sort of mental phenomenon The immense majority of human decisions are decisions without effort In comparatively few of them in most people does effort accompany the final act We are I think misled into *supposing that effort is more frequent than it is* by the fact that *during deliberation* we so often have a feeling of how great an effort it would take to make a decision *now* Later after the decision has made itself with ease *we recollect this and erroneously suppose the effort also to have been* made then

The existence of the effort as a phenomenal fact in our consciousness cannot *of course be doubted or denied Its significance on the other hand is a matter* about which the gravest difference of opinion prevails Questions as momentous as that of the very existence of spiritual causality as vast as that of universal predestination or free will depend on *its interpretation It therefore becomes* essential that we study with some care the conditions under which the feeling of volitional effort is found

The Feeling of Effort

When awhile back (p 793) I said that *consciousness* (or the neural process which goes with it) *is in its very nature impulsive* I added in a note the proviso that *it must be sufficiently intense* Now there are remarkable differences in the power of different sorts of consciousness to excite movement *The intensity of* some feelings is practically apt to be below the discharging point whilst that of others is apt to be above it By practically apt I mean apt under ordinary circumstances *These circumstances may be habitual inhibitions like that com*fortable feeling of the *dolce far niente* which gives to each and all of us a certain dose of laziness only to be overcome by the acuteness of the impulsive spur or they may consist in *the native inertia or internal resistance of the motor cen*

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tions ordinarily effortless or abstinences ordinarily easy either become impos-
sible or are effected if at all by the expenditure of effort. A little more descrip-
tion will make it plainer what these cases are.

There is a cert in normal ratio in the impulsive power of different sorts of motive which characterizes what may be called ordinary healthiness of will and which is departed from only at exceptional times or by exceptional indi viduals. The states of mind which normally possess the most impulsive quality are either those which represent objects of passion appetite or emotion—ob- short or they are feelings or ideas of pleasure or

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time Compared with these various objects all far-off considerations abstract conceptions unaccustomed reasons and motives foreign to the instinctive history of the race have little or no impulsive power They prevail when they ever do prevail *with effort and the normal* as distinguished from the pathological *sphere of effort is thus found wherever non inst nctive motives of behavior are to rule the day*

Healthiness of will moreover requires a certain amount of complication in the process which precedes the fiat or the act Each stimulus or idea at the same t— wh its own impulse must arouse other ideas (associated and

and a vi on of which course is best before the fiat comes And wh re the will is healthy *the vis on m st be ri ht* (i e the motives must be on the whole in a normal or not too unusual ratio to each other) *and the action must obey the vision s lead*

U health ness of will may thus come about in many ways The action may follow the stimulus or dea too rapidly leaving no time for the arousal of re- trainin associates—*we then have a p ecip tate will* Or although the associ ates may come the ratio which the impuls e and inhibitive forces normally bear to each other may be distorted and we then have *a will which is per e se* The perversity in turn may be due to either of many causes—too much in tensit o too little here too much or too little inertia there or elsewhere too much or too little nhib tory power *If we compa e the outward symptoms of perversity t gether they fall into two groups* in one of which normal actions

are impossible and in the other abnormal ones are irrepressible Briefly *we may call them respectively the obstructed and the explosive will*

It must be kept in mind however that since the resultant action is always due to the *ratio* between the obstructive and the explosive forces which are present we never can tell by the mere outward symptoms to what *elementary* cause the perversion of a man s will may be due whether to an increase of one component or a diminution of the other One may grow explosive as readily by losing the usual brakes as by getting up more of the impulsive steam and one may find things impossible as well through the enfeeblement of the original desire as through the advent of new lions in the path As Dr Clouston says The driver may be so weak that he cannot control well broken horses or the horses may be so hard mouthed that no driver can pull them up In some concrete cases (whether of explosive or of obstructed will) it is difficult to tell whether the trouble is due to inhibitory or to impulsive change Generally however we can make a plausible guess at the truth

The Explosive Will

There is a normal type of character for example in which impulses seem to discharge so promptly into movements that inhibitions get no time to arise These are the dare devil and mercurial temperaments overflowing with animation and fizzling with talk which are so common in the Latin and Celtic races and with which the cold blooded and long headed English character forms so marked a contrast Monkeys these people seem to us whilst we seem to them reptilian It is quite impossible to judge as between an obstructed and an explosive individual which has the greatest sum of vital energy An explosive Italian with good perception and intellect will cut a figure as a perfectly tremendous fellow on an inward capital that could be tucked away inside of an obstructed Yankee and hardly let you know that it was there He will be the king of his company sing all the songs and make all the speeches lead the parties carry out the practical jokes kiss all the girls fight the men and if need be lead the forlorn hopes and enterprises so that an onlooker would think he has more life in his little finger than can exist in the whole body of a correct judicious fellow But the judicious fellow all the while may have all these possibilities and more besides ready to break out in the same or even a more violent way if only the brakes were taken off It is the absence of scruples of consequences of considerations the extraordinary simplification of each moment s mental outlook that gives to the explosive individual such motor energy and ease it need not be the greater intensity of any of his passions motives or thoughts As mental evolution goes on the complexity of human consciousness grows ever greater and with it the multiplication of the inhibitions to which every impulse is exposed But this predominance of inhibition has a bad as well as a good side and if a man s impulses are in the main orderly as well as prompt if he has courage to accept their consequences and intellect to lead them to a successful end he is all the better for his hair trigger organization and for not being sicklied o er with the pale cast of thought Many of the most successful military and revolutionary characters in history have belonged to this simple but quickwitted impulsive type Problems come much harder to

reflecti e and inhibitive minds. They can it is true solve much vaster problems and they can avoid many a mistake to which the men of impulse are exposed But when the latter do not make mistakes or when they are always able to retrieve them theirs is one of the most engaging and indispensable of human types.

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type I cannot do better here than copy a few pages from Dr Clouston s excellent work

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Man persons ha e so small a tock of reser brain power—that m st valuable of all brain-qualities—that t is soon used up and y u see at ce that they lo e their po er of self-co trol very oon. They are angels o dem ns just as they are fresh or tired. That urplus store f en rgy resu ti e force which provides in persons nor mal t tut d, that moderate excesses in all directions shall d no great harm so

self-control, with the will when exercised in certain directions It is the character is f m t f rms f mental disease f self-c ntrol to be lo t but this loss is usually

In an excell t rticl "Th *Mental Qualities f an Athl t* in th *Harvard M thly* vol. vi, p. 4 Mr A. T Dudley assigns th first place t th rapidly impulsive temperament. Ask him h w in some complex trick, h perf rmed certain t, why h pushed pulled t certain instant, and h will tell y he does t kn w h did t by instinct rather his erves and muscles did t f th mselves. Here is th distinguishin featur f th good pla th good playe confident in his training and his practice in th critical gam trusts turel t his impulse, and does t think ut every move Th poo player unable t trust his impuls actions, is compelled to think carefull all th time. H thus no nly loses th pport nities thro gh his sl wness in comprehending th wh le situatio b t being compelled t think rapidly all the tim t critical points bec mes co fused while the first rate play not trying t reason, b t cting as impulse directs, is co tinually distinguishin himself and pla th better under th greate pressure.

T S Clouston, *Clinical Lectur on Mental Diseas* (London, 883) pp 3 0- 8

part of a general mental affection with melancholic maniacal demented or delusional symptoms as the chief manifestation of the disease.

There are other cases not so numerous where the loss of the power of inhibition is the chief and by far the most marked symptom I shall call this form Inhibitory *Insanity Some of these cases have uncontrollable impulses to violence and destruction* others to homicide others to suicide prompted by no depressed feelings others to acts of animal gratification (satyriasis nymphomania erotomania bestiality) others to drinking too much alcohol (*dipsomania*) *others towards setting things on* fire (pyromania) others to stealing (kleptomania) and others towards immoralities of all sorts The impulsive tendencies and morbid desires are innumerable in kind. Many of these varieties of Insanity have been distinguished by distinct names to dig up and eat dead bodies (necrophilism) to wander from home and throw off the restraints of society (planomania) to act like a wild beast (lycanthropia) etc Action from impulse in all these directions may take place from a loss of controlling power in the higher regions of the brain or from an over development of energy in certain portions of the brain which the normal power of inhibition cannot control *The driver may be so weak* that he cannot control well broken horses or the horses may be so hard mouthed that no driver can pull them up Both conditions may arise from purely cerebral disorder or may be reflex The *ego* the man the will may be non existent for the time The most perfect examples of this are murders done *during somnambulism or epileptic unconsciousness or acts done in the hypnotic state.* There is no conscious desire to attain the object at all in such cases

In other cases there is consciousness and memory present but no power of restraining action The simplest example of this is where an imbecile or dement seeing something glittering appropriates it to himself or when he commits indecent sexual acts Through disease a previously sane and vigorous minded person may get into the same state The motives that would lead other persons not to do such acts do not operate in such persons I have known a man steal who said he had no intense longing for the article he appropriated at all at least consciously but his will was in abeyance and he could not resist the ordinary desire of possession common to all human nature

It is not only those technically classed imbeciles and dements who exhibit this promptitude of impulse and tardiness of inhibition Ask half the common *drunkards you know why it is that they fall so often a prey to temptation and* they will say that most of the time they cannot tell It is a sort of vertigo with them Their nervous centres have become a sluice way pathologically unlocked *by every passing conception of a bottle and a glass They do not thirst for the* beverage the taste of it may even appear repugnant and they perfectly foresee the morrow s remorse But when they think of the liquor or see it they find themselves preparing *to drink and do not stop themselves and more than this* they cannot say Similarly a man may lead a life of incessant love-making or sexual indulgence though what spurs him thereto seems rather to be suggestions and notions of possibility *than any overweening strength in his* affections or lusts He may even be physically impotent all the while The paths of natural (or it may be unnatural) impulse are so pervious in these characters that the *slightest rise in the level of innervation produces an overflow* It is the condition recognized in pathology as irritable weakness The phase known as nascency or latency is so short in the excitement of the neural tissues that there is no opportunity *for strain or tension* to accumulate within them and the consequence is that with all the agitation and activity the amount of real feeling engaged may be very small The hysterical temperament is the playground *par*

excellence of this unstable equilibrium One of these subjects will be filled with what seems the most genuine and settled aversion to a certain line of conduct and the very next *instant* follow the stirring of temptation and plunge in it up to the neck. Professor Ribot well gives the names of *Le Règne des caprices*' to the chapter in which he describes the hysterical temperament in his interesting little monograph *The Diseases of the Will*

Disorderly and impulsive conduct may on the other hand come about where the neural tissues preserve their proper inward tone and where the inhibitory power is normal or even unusually great In such cases *the strength of the im* d nd what would be for most people the

Glénadal ha ing lo t his father in infancy was br ught up by his mother whom he adored. At sixteen his charact r till then good and docile, chang d. H became gloomy and taciturn. Pressed with questions by his mother he d cided at last to make a c nfession. T you, said he I owe everything I lo e you with all my soul yet fo som tim past an in essant dea dri es me to kill you. Prevent so ter rible misf rtune fr m happenin, in case some day the *temptat on should o er* power me allow m t enlist. Notwithstanding pressing solicitations he was firm in his resol e, went off and was a good soldier Still a secret impulse timulated him with ut cessation to desert in rder to com hom and kill his mothe At the end of his term of erv e the dea was as strong as on the first day He enlisted for another term. The m der us instinct persisted, but substituted another ictim. He no longer thought of killing h h mbl mn l e pointed day and ni ht towards his sister in law In petual exile. At thi confesses all his tre sister in-law has just died. At these

J y fills his heart He tra els to the home of his childhood un isited fo so many years. But as he arri es h sees his siste in-law li ing He gi es ry and the terrible impulse seizes him again as a p ey That ery evening h makes his b the tie him fast. "Take a solid ope, bind m like wolf in the barn, and g and tell D Calmeil.

F om him h g t admissi n t an insan asylum. The evening befo e his entrance he wrote t th di ct of the establishment Sir I am t becom an inmate of your house. I shall beha there as f I were in the egiment. You will think m cured. At moments pe hap I shall p etend t be so Ne er believe me. Ne e let me out n any p etext. If I beg t be eleased doubl your watchfulness the only use I shall make f my liberty will be to commit a crime which I abh r

The cravin for drink in real d psomaniacs o for op um or chloral in those subjugated is of a strength f which normal persons can form no conception. Were a keg of rum in one corner of a room and were a cannon constantly discharging balls between me and it I could not refrain from passing before that

In his *Maladie d la lonté* p. 77

F th cases f "impulsi insanity see H. Ma dsley *Responsibility in Mental Dis ease* pp 33 o, and F bes Winslow *Obscur Diseases f the Mind and B ain* chapters vi. ii viii.

cannon in order to get the rum if a bottle of brandy stood at one hand and the pit of hell yawned at the other and I were convinced that I should be pushed in as sure as I took one glass I could not refrain —such statements abound in dipsomaniacs mouths Dr Mussey of Cincinnati relates this case

A few years ago a tippler was put into an almshouse in this State Within a few days he had devised various expedients to procure rum but failed At length however he hit upon one which was successful He went into the wood yard of the establishment placed one hand upon the block and with an axe in the other struck it off at a sin le blow With the stump raised and streaming he ran into the house and cried Get some rum! get some rum! my hand is off! In the confusion and bustle of the occasion a bowl of rum was brought into which he plunged the bleeding member of his body then raising the bowl to his mouth drank freely and exultingly exclaimed Now I am satisfied Dr J E Turner tells of a man who while under treatment for inebriety during four we [1]

1 pu ns of my heart

The passion of love may be called a monomania to which all of us are subject however otherwise sane It can coexist with contempt and even hatred for the object which inspires it and whilst it lasts the whole life of the man is altered by its presence Alfieri thus describes the struggles of his unusually powerful inhibitive power with his abnormally excited impulses toward a certain lady

Contemptible in my own eyes I fell into such a state of melancholy as would if long continued inevitably have led to insanity or death I continued to wear my disgraceful fetters till towards the end of January 1775 when my rage which had hitherto so often been restrained within b d b l with the greatest vio-
l and tiresome amuse
the woman who was
object of my antipathy and my love I took the firm determination of emancipating myself forever from her yoke Experience had taught me that flight so far from enabling me to persevere in my resolutions tended on the contrary to weaken and destroy them I was inclined therefore to subject myself to a still more severe trial imagining from the obstinacy and peculiarity of my character that I should succeed most certainly by the adoption of such measures as would compel me to make the greatest efforts I determined never to leave the house which as I have already said was exactly opposite that of the lady to gaze at her windows to see her go in and out every day to listen to the o d f h l

l g ve stability to my purpose and to render it impossible for me to waver without the imputation of dishonor I communicated my determination to one of my friends who was greatly attached to me and whom I highly esteemed He had lamented the state of mind into which I had fallen but not wishing to give countenance to my conduct and seeing the impossibility of inducing me to abandon it he had for some time ceased to visit at my house In the few lines which I addressed to him I briefly stated the resolution I had adopted and as a pledge of my constancy I sent him a long tress of my ugly red hair I had purposely caused it to be

[1] Quoted by G Burr in an rticle on The Insanity of Inebriety n the N Y Psychological and Medico Legal Jour al D c 1874

cut off in orde to p event my go n out as no one but clowns and sailors then ap- pe d n hl with sho t hair I co clud d my billet by conjuring him to strengthen a ~ 1 I olated in this manner in my own l

ran o er without understandin a single w 1
the end of Ma ch 17 5 in state borderin on frenzy but about this time a new dea darted into my mind which tended to assua e my melancholy

This was the idea of poetical composition at wh ch Alfieri describes his first attempts made under the e disea ed circumstances and goes on

Th only good that occurred t me from this whim was that of gradually detaching me from lo e and f awakening my reason which had so long lain dormant I no l nger found t n cessary to c use myself to be tied with cords to a ch r in rder to I d m to that of my lady This had been

manner I em ned in this s tuat on for wh le no rs
al e intrusted w th the c et He alw ys liber ted me as he had b en enjoined henever the paroxysms of my rage subsided. Of all the whimsi al methods which I employed, however the m t curious was th t f appearing in ma qu rade at the theatre towa ds the end of the carni al Hab ted as Apollo I ventured to present myself with a lyre on whi h I play d well as I was able and sang some bad verses of my wn c mposing S ch ff nt ry was diam trically oppo te to my natural character The nly ff f r uch scenes was my in bility t resist an imperious passio its obj t and me expose myself by renewing an cule.

Often the insistent dea is of a trivial sort but it may wear the patient s life out His hands feel dirty they must be washed He *k ows* they are not dirty yet to get rid of the teas ng idea he washes them The idea however *returns in* a moment and the unfo tunate v ctim who is not in the least deluded *intellectu lly* will end by spending the whole day at the wash stand Or his clothes are not r ghtly put on and to banish the thought he takes them off and puts them on again till his toilet consumes two or three hours of time Most people ha e the potent al ty of this d sease To few has it not happened to concei e afte gettin i to bed that they may ha e forgotten to l ck the front door or to turn out the entry gas And few of us have not on some occas on got p t epeat th p rf rmance less because they believed in the reality of its omiss n than because only so could they banish the worrying doubt and get to sleep

Aut b g phy H ll edi (877) pp 9 -96
See pape Insistent nd Fixed Ideas by D Cowles in th *America J rnal f P ych logy* i, p and an ther th so-called Insanity f D bt by D Knapp *ibid* iii, p. The latter tains partial bibli graphy f the bject.

The Obstructed Will

In striking contrast with the cases in which inhibition is insufficient or impulsion in excess are those in which impulsion is insufficient or inhibition in excess We all know the condition described on p 261 in which the mind for a few moments seems to lose its focussing power and to be unable to rally its attention to any determinate thing At such times we sit blankly staring and do nothing The objects of consciousness fail to touch the quick or break the skin They are there but do not reach the level of effectiveness This state of non efficacious presence is the *normal condition of some objects in all of u* Great fatigue or exhaustion may make it the condition of almost all objects and an apathy resembling that then brought about is recognized in asylums under the name of *abulia* as a symptom of mental disease The healthy state of the will requires as aforesaid both that vision should be right and that action should obey its lead But in the morbid condition in question the vision may be wholly unaffected and the intellect clear and yet the act either fails to follow or follows in some other way *Video meliora proboque deteriora sequor'* is the classic expression of the latter condition of mind The former it is to which the name *abulia* peculiarly applies The patients says Guislain

> are able to will inwardly mentally according to the dictates of reason They experience the desire to act but they are powerless to act as they should Their will cannot overpass certain limits one would say that the force of action within them is blocked up the *I will* does not transform itself into impulsive volition into active determination Some of these patients wonder themselves at the impotence with which their will is smitten If you abandon them to themselves they pass whole days in their bed or on a chair If one speaks to them or excites them they express themselves properly though briefly and judge of things pretty well [1]

In Chapter xxi as will be remembered it was said that the sentiment of reality with which an object appealed to the mind is proportionate (amongst other things) to its efficacy as a stimulus to the will Here we get the obverse side of the truth Those ideas objects considerations which (in these lethargic states) fail to *get to* the will fail to draw blood seem in so far forth distant and unreal The connection of the reality of things with their effectiveness as motives is a tale that has never yet been fully told The moral tragedy of human life comes almost wholly from the fact that the link is ruptured which normally should hold between vision of the truth and action and that this pungent sense of effective reality will not attach to certain ideas Men do not differ so much in their mere feelings and conceptions Their notions of possibility and their ideals are not as far apart as might be argued from their differing fates No class of them have better sentiments or feel more constantly the difference between the higher and the lower path in life than the hopeless failures the sentimentalists the drunkards the schemers the dead beats whose life is one long contradiction between knowledge and action and who with full command of theory never get to holding their limp characters erect No one eats of the fruit of the tree of knowledge as they do as far as moral insight goes in comparison with them the orderly and prosperous philistines whom they scandalize are sucking

[1] Quoted by Ribot *op* *c* p 39

babes And yet their moral knowledge always there grumbling and rumblin, in the background —discerning commenting protesting longing half resolving —never wholly resolves never gets its voice out of the minor into the major key or its speech out of the subjunctive into the imperative mood never breaks the pell never takes the helm into its hands In such characters as Rous eau and Restif it would seem as if the lower motives had all the impulsive efficacy in their hands Like trains with the right of way they retain exclusive possession of the track The more ideal motives exist alongside of them in profusion but they never get switched on and the man s conduct is no more influenced by them than an express train is influenced by a wayfarer standin, by the roadside and calling to be taken aboard They are an inert accompaniment to the end of time and the consciousness of inward hollowness that accrues from habitually seeing the better only to do the worse is one of the saddest feelings one can bear with him through this vale of tears

We now see at one view when it is that effort complicates volition It does so whenever a rarer and more ideal impulse is called upon to neutralize others of a more instinctive and habitual kind it does so whenever strongly explosive tendencies are checked or strongly obstructive conditions overcome The *ame bien née* the child of the sunshine at whose birth the fairies made their gifts does not need much of it in his life The hero and the neurotic subject on the other hand do Now our spontaneous way of conceiving the effort under all these circumstances is as an active force adding its strength to that of the motives which

mo nre upon a body we say that the re-

if the li e of coarser motivation were the more perv ous and easy one

the very moment when we refuse to follow it He who under the surgeon s knife rep esses cries of pa n or he who exposes himself to social obloquy for duty s sake feels as if he were following the line of greatest temporary resistance He speaks of conquer ng and o ercoming his impulses and temptations

d the drunkard the coward never talk of their conduct in

says he forgets his deals is deaf to duty and so fo th which terms seem to imply that the ideal mot ves pe se can be annulled with ut energy or effort and that the st ongest me e tract on lies n the line of the propensities The ideal imp lse appears in comparison with this a still small voice which must be arti f cially re nforced to p evail Effort is what re nforces it making things seem as if wh le the forc of propens ty were essentially a fixed quantity the ideal force m ght be of various amount But what determines the amount of the effort when

by its aid an ideal motive becomes victorious over a great sensual resistance? The very greatness of the resistance itself If the sensual propensity is small the effort is small The latter is *made great* by the presence of a great antagonist to overcome And if a brief definition of ideal or moral action were required none could be given which would better fit the appearances than this *It is action in the line of the greatest resistance*

The facts may be most briefly symbolized thus P standing for the propensity, I for the ideal impulse and E for the effort

$$I \; per \; se < P$$
$$I + E > P$$

In other words if E adds itself to I P immediately offers the least resistance and motion occurs in spite of it

But the E does not seem to form an integral part of the I It appears adventitious and indeterminate in advance We can make more or less as we please and *if* we make enough we can convert the greatest mental resistance into the least Such at least is the impression which the facts spontaneously produce upon us But we will not discuss the truth of this impression at present let us rather continue our descriptive detail

Pleasure and Pain as Springs of Action

Objects and thoughts of objects start our action but the pleasures and pains which action brings modify its course and regulate it and later the thoughts of the pleasures and the pains acquire themselves impulsive and inhibitive power Not that the thought of a pleasure need be itself a pleasure usually it is the reverse—*nessum maggior dolore* as Dante says—and not that the thought of pain need be a pain for as Homer says griefs are often afterwards an entertainment But as present pleasures are tremendous reinforcers and present pains tremendous inhibitors of whatever action leads to them so the thoughts of pleasures and pains take rank amongst the thoughts which have most impulsive and inhibitive power The precise relation which these thoughts hold to other thoughts is thus a matter demanding some attention

If a movement feels agreeable we repeat and repeat it as long as the pleasure lasts If it hurts us our muscular contractions at the instant stop So complete is the inhibition in this latter case that it is almost impossible for a man to cut or mutilate himself slowly and deliberately—his hand invincibly refusing to bring on the pain And there are many pleasures which when once we have begun to taste them make it all but obligatory to keep up the activity to which they are due So widespread and searching is this influence of pleasures and pains upon our movements that a premature philosophy has decided that these are our only spurs to action and that wherever they seem to be absent it is only because they are so far on among the remoter images that prompt the action that they are overlooked

This is a great mistake however Important as is the influence of pleasures and pains upon our movements they are far from being our only stimuli With

the manifestations of instinct and emotional expression for example they have absolutely nothing to do Who smiles for the pleasure of the smiling or frowns for the pleasure of the frown? Who blushes to escape the discomfort of not blushing? Or who in anger grief or fear is actuated to the movements which he makes by the pleasures which they yield? In all these cases the movements are discharged fatally by the *vis a tergo* which the stimulus exerts upon a nervous system framed to respond in just that way The objects of our rage love or terror the occasions of our tears and smiles whether they be present to our senses or whether they be merely represented in idea have this peculiar sort of impulsive power The *impulsive quality* of mental states is an attribute behind which we cannot go Some states of mind have more of it than others some have *it in this direction and some in that. Feelings of pleasure and pain have it* and perceptions and imaginations of fact have it but neither have it *exclusively or peculiarly It is of the essence of all consciousness* (or of the neural process which underlies it) to instigate movement of some sort. That with one creature and object it should be of one sort with others of another sort is a problem for evolutionary history to explain However the actual impulsions may have arisen they must now be described as they exist and those persons obey a curiously narrow teleological superstition who think themselves bound to interpret them in every instance as effects of the secret solicitancy of pleasure and repugnancy of pain.

Th silliness f th ld fa hi ed pleasure phil phy t ux 3 ux Take f ex ample, Prof. Bain explanatio f sociability and parental l by th plea ures f t uch "Touch is the fundamental and gen ri sense E e ft th remaining senses ar dif f rentia ed th primary sense tin es t be leading u eptibility f th mind. Th soft warm to ch, if not first-class infl ence is t least an pp oach t th t Th mbined pow warmth m ts to nsiderabl pitch f massiv pleasure,

l

sa n, the ne plus ult it must be pleasur f the highest degree. y so uu

For this pleasur every creature is disposed t pay something en when t is nly fraternal. A certain amount f mat rial ben fit imparted is co ditı f th f ll heartiness f respo ding mb ce th mpl t fruiti f this primiti y In th absenc f th se conditions the pleasure f gi ing can scarcely be counted f we kn w full well that, with t these helps, w ld be ery meagr se tim t in bei gs like rsel es. It seems t me that there must be t th [pare tal instinct] f undatio that intense pleasur in the embrace f th y ung which w find to characteriz th parental feeling th ugh t. uch pleasur nc created w uld ssociat tself with th prevailing feat res d aspects of th young and give to all f these their very gre t interest. F the sak f th pleasure th parent discov rs th necessit f nourishing th bject f t, and comes to regard th ministering f ncti as part nditio f the delight (*Th Em t ns nd the Will* pp 6 3 3 Prof Bain does t explain wh satin cu hi kept t bo t

It migh ... ould justify itself that ... *ote and reasonable* motives ... we *ought* to act That is an *ethical* propo s ... which a good deal may be said But it is not a *psychological* proposition and nothing follows from it as to the motives upon which as a matter of fact we *do* act These motives are supplied by innumerable objects which innervate our voluntary muscles by a process as automatic as that by which they light a fever in our breasts *If the thought of pleasure can impel to action surely* other thoughts may Experience only can decide which thoughts do The chapters on Instinct and Emotion have shown us that their name is legion and with this verdict we ought to remain contented and not seek an illusory simplification at the cost of half the facts

If in these our *first* acts pleasures and pains bear no part as little do they bear in our last acts or in those artificially acquired performances which have become habitual All the daily routine of life our dressing and undressing the coming and *going from our work or carrying through of its various operations* is utterly without mental reference to pleasure and pain except under rarely realized conditions It is ideo motor action As I do not breathe for the pleasure of the breathing but simply find that I *am* breathing so I do not write for the pleasure of the writing but simply because I have once begun and being in a state of intellectual excitement which keeps venting itself in that way find that I *am* writing still Who will pretend that when he idly fingers his knife handle at the table it is for the sake of any pleasure which it gives him or pain which he thereby avoids We do all these things because at the moment we cannot help it our nervous systems are so shaped that they overflow in just that way and for many of our idle or purely nervous and fidgety performances we can assign absolutely *no reason at all*

Or what shall be said of a shy and unsociable man who receives point blank an invitation to a small party? The thing is to him an abomination but your presence exerts a compulsion on him he can think of no excuse and so says yes cursing himself the while for what he does He is unusually *sui compos* who does not every week of his life fall into some such blundering act as this Such instances of *voluntas invita* show not only that our acts cannot all be conceived as effects *of represented* pleasure but that they cannot even be classed as cases of represented *good* The class goods contains many more generally influential motives to action than the class pleasants Pleasures often attract us only because we deem them goods Mr Spencer e g urges us to court pleasures *for their influence upon health which comes to us as a good But almost* as little as under the form of pleasures do our acts invariably appear to us under the form of *goods* All diseased impulses and pathological fixed ideas are instances

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98 F would not on the whol g ve us the pleasu e in question more ch aply th n our friends and bab s do It is true that the cushion might lack the ccult magnetic influ nc s *Most of us would say that neither a baby s nor a friend s skin w uld posse s them n re not* a tenderness already there The youth wh feels estasy hoot th ough him wh n by accident the silken palm or even the ve tur s hem of h s idol touches him would hardly feel it v e e be not hard h t by Cup d in ad anc Th lov c eates the estasy not the ecstasy the love And for the est f us can it pos ibly be that all our social virtu prangs fr m an appetite for the sensual plea ure of having our hand shaken or being sl pped n the back?

to the contrary It is the very badness of the act that gives it then its vertiginous fascination Remove the prohibition and the attraction stops In my university days a student threw himself from an upper entry window of one of the college buildings and was nearly killed Another student a friend of my own had to pass the from his room and experienced a dreadful

just to bring out [illegible]

again just to verify *once more how bad it is* This very day I have been repeating over and over to myself a verbal jingle whose mawkish silliness was the secret of its haunting power I loathed yet could not banish it.

Believers in the pleasure and pain theory must thus if they are candid make large exceptions in the appl cation of their creed Action from fixed ideas is accordingly a terrible stumbling block to the candid Professor Bain Ideas have in his psychology no impulsive but only a guid ng function whilst

> The proper stimulus of the will namely some variety of pleasure and pa n is n ded to gi e the impetus The intell ctual link is not sufficient for caus g the de d to rise at the b k of th dea (xcept n a case of an *idée fi e*) but should any *pl asure* spring up o be co tinued by pe forming an action that w clearly c nce ve the ca sation is then complete b th the directing and the mo ing powers are present.[1]

Pleasures and pains are for Professor Bain the *genuine* impulses of the will [2]

> W thout an a teced t of plea ur ble o painful f eling—actual or ideal primary o den au e—the will c nnot be st mul ted Through all the disguises that w ap up what w call m t es something of one or th other of thes two grand conditions can be detected.

Dis t ted mpulses are wholly distinct f om the att inment of pleasure and the

Sympathy has this in common with the Fixed Idea that it clashes with the regular outgoings of the will in favor of our pleasures

P of Bain thus admits all the essent al facts Pleasure and pain are motives of only part of our activity But he prefers to g ve to that pa t of the activity ex clus ely wh ch these feelings prompt the name of *regular* outgoings and g u e impulses of the w ll and to treat all the rest as mere parado es and

[1] *The Em tio d th Will* p 35 B t Bain n descript b lies his f mul f th idea ppears as th m ing d th pl as th dir ting f p. 398. p. 354. p 355 p 390. pp 95–96 [2] p
Cf also Bain t t J mes Mill *Analysis* I. II, p 3 5

anomalies of which nothing rational can be said This amounts to taking one species of a genus calling it alone by the generic name and ordering the other co ordinate species to find what names they may At bottom this is only verbal play How much more conducive to clearness and insight it is to take the *genus* springs of action and treat it as a whole and then to distinguish within it the species pleasure and pain from whatever other species may be found!

There is it is true a complication in the relation of pleasure to action which partly excuses those who make it the exclusive spur This complication deserves some notice at our hands

An impulse which discharges itself immediately is generally quite *neutral* as regards pleasure or pain—the breathing impulse for example If such an im pulse is arrested however by an extrinsic force a great feeling of *uneasiness* is produced—for instance the dyspnœa of asthma And in proportion as the ar resting force is then overcome *relief* accrues—as when we draw breath again after the asthma subsides The relief is a pleasure and the uneasiness a pain and thus it happens that round all our impulses merely as such there twine as it were secondary possibilities of pleasant and painful feeling involved in the manner in which the act is allowed to occur These *pleasures and pains of achievement discharge or fruition* exist no matter what the original spring of action be We are glad when we have successfully got ourselves out of a danger though the thought of the gladness was surely not what suggested to us to es cape To have compassed the steps towards a proposed sensual indulgence also makes us glad and this gladness is a pleasure additional to the pleasure origi nally proposed On the other hand we are chagrined and displeased when any activity however instigated is hindered whilst in process of actual discharge We are uneasy till the discharge starts up again And this is just as true when the action is neutral or has nothing but pain in view as its result as when it was undertaken for pleasure s express sake The moth is probably as annoyed if hin dered from getting into the lamp flame as the *roué* is if interrupted in his de bauch and we are chagrined if prevented from doing some quite unimportant act which would have given us no noticeable pleasure if done merely because the prevention itself is disagreeable

Let us now call the pleasure *for the sake* of which the act may be done the *pursued pleasure* It follows that even when no pleasure is pursued by an act the act itself may be the *pleasantest line* of conduct when once the impulse has begun on account of the incidental pleasure which then attends its successful achievement and the pain which would come of interruption A *pleasant act* and an act *pursuing a pleasure* are in themselves however two perfectly distinct conceptions though they coalesce in one concrete phenomenon whenever a pleasure is deliberately pursued I cannot help thinking that it is the *confusion of pursued pleasure with mere pleasure of achievement* which makes the pleas ure theory of action so plausible to the ordinary mind We feel an impulse no matter whence derived we proceed to act if hindered we feel displeasure and if successful relief Action *in the line of the present impulse* is always for the time being the pleasant course and the ordinary hedonist expresses this fact by saying that we act for the *sake* of the pleasantness involved But who does not see that for this sort of pleasure to be possible *the impulse must be there*

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by some previous means

It is true that on pecial occasions (so complex is the human mind) *pleasure of achievement may itself become a pursued pleasure* and these cases form another point on which the pleasure-theory is apt to rally Take a foot ball game or a fox hunt Who in cold blood wants the fox for its own sa h s goal or that? We know however by
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done with it ... emerge in the joy of being done with them Like Hamlet we say of each successive task

O cursed spite
That ever I was bo n to set it right!

and then we often add to the original impulse that set us on this additional one that we shall feel so glad wh n well through with it that thought also having its impulsive spur But b pursued pleasure upon oc that pleasure must be w
...

ne ther need we act for the sake of escaping the uneas ness of arrest This uneasiness is altogethe due to the fact that the act is *already tend ng to occur* on other grounds And these original grounds are what impel to its continuance even though the uneasiness of the arrest may upon occasion add to their impulsive powe

To conclude I am far from denying the exceeding prominence and importance of the part which pleasu es and pains both felt and represented play in the motivation of our cond ct But I must insist that it is no exclusive part and

H w m ch cle H m h d was th th t f his di ciples! "It has b en p d bey d all t rsy th t th passi ns mm nly est med selfish carry th Mi d bey d self directly to th bj t that th gh th satisf cti f th se p si gi es us enj yment, y t th prospect f this y m t is t th ca f th passi b t, n th trary th passi is anteced t t th enj ym t and w th t th f m th l tt could ever possibly exist, tc. (Es y th Diff t Sp ci f Phil phy § t ar th end.)

anomalies of which nothing rational can be said This amounts to taking one species of a genus calling it alone by the generic name and ordering the other co ordinate species to find what names they may At bottom this is only verbal play How much more conducive to clearness and insight it is to take the *genus* springs of action and treat it as a whole and then to distinguish within it the species pleasure and pain from whatever other species may be found!

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pleasure is [illegible]

of pursued

ure-theory [illegible]

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me it also does not. My willing representation can no more instigate my sneezing-centre than it can instigate the table to activity. But in both cases it is as true and good willing as it was when I willed to write.[1] In a word, volition is a psychic or moral fact pure and simple, and is absolutely completed when the stable state of the idea is there. The supervention of motion is a supernumerary phenomenon depending on executive ganglia whose function lies outside the mind.

In St. Vitus' dance, in locomotor ataxy, the representation of a movement and the consent to it take place normally. But the inferior executive centres are deranged, and although the ideas discharge them, they do not discharge them so as to reproduce the precise sensations anticipated. In aphasia the patient has an image of certain words which he wishes to utter, but when he opens his mouth he hears himself making quite unintended sounds. This may fill him with rage and despair—which passions only show how intact his will remains. Paralysis only goes a step farther. The associated mechanism is not only deranged but altogether broken through. The volition occurs, but the hand remains as still as the table. The paralytic is made aware of this by the absence of the expected change in his afferent sensations. He tries harder, i.e., he mentally frames the sensation of muscular 'effort,' with consent that it shall occur. It does so: he frowns, he heaves his chest, he clinches his other fist, but the palsied arm lies passive as before.[2]

We thus find that *we reach the heart of our inquiry into volition when we ask by what process it is that the thought of any given object comes to prevail stably* [illegible] prevail without effort, we have sufficiently studied [illegible]

other hand the prevalence of the thought is accompanied by the phenomenon of effort, the case is much less clear. Already in the chapter on attention we postponed the final consideration of voluntary attention with effort to a later place. We have now brought things to a point at which we see that attention with effort is all that any case of volition implies. *The essential achievement of the will,* [illegible] *short, when it is most 'voluntary,' is to* ATTEND *to a difficult object and hold it fast before the mind.* The so-doing *is* the *fiat*; and it is a mere physio-

[1] This sentence is written from the [illegible] tho[illegible] own consciousness. But many persons say that where they disbelieve in the effects ensuing, as in the case of the table, they cannot will it. They cannot exert [illegible] volition that [illegible] table should move. This personal difference may be partly verbal. Different people may attach different connotations to the word "will." But I incline to think that we differ psychologically as well. When one knows that he has no power, one's desire of [illegible] thing is called [illegible] wish and not [illegible] will. The *sense* [illegible] *of impotence inhibits* the volition. Only by abstracting from the thought of the impossibility am I able to imagine strongly the table sliding [illegible] the floor, to make the bodily effort which I do, and to will it to come towards me. It may be that some people are unable to perform this abstraction, and that the image of the table stationary [illegible] the floor inhibits the contradictory image of its moving which is the object to be willed.

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that co-ordinately with these *mental objects* innumerable others have an exactly similar impulsive and inhibitive power [1]

If one must have a single name for the condition upon which the impulsive and inhibitive quality of objects depends one had better call it their *interest* The interesting is a title which covers not only the pleasant and the painful but also the morbidly fascinating the tediously haunting and even the simply habitual inasmuch as the attention usually travels on habitual lines and what we attend to and what interests us are synonymous terms It seems as if we ought to look for the secret of an idea s impulsiveness not in any peculiar relations which it may have with paths of motor discharge —for *all* ideas have relations with some such paths—but rather in a preliminary phenomenon the *urgency namely with which it is able to compel attention and dominate in consciousness* Let it once so dominate let no other ideas succeed in displacing it, and whatever motor effects belong to it by nature will inevitably occur—its impulsion in short will be given to boot and will manifest itself as a matter of course This is what we have seen in instinct in emotion in common ideo-motor action in hypnotic suggestion in morbid impulsion and in *voluntas in vita* —*the impelling idea is simply the one which possesses the attention* It is the same where pleasure and pain are the motor spurs—they drive other thoughts from consciousness at the same time that they instigate their own char acteristic volitional effects And this is also what happens at the moment of the *fiat* in all the five types of decision which we have described In short *one does not see any case in which the steadfast occupancy of consciousness* does not appear to be the prime condition of impulsive power It is still more obviously the prime condition of inhibitive power What checks our impulses is th m th nking of reasons to the contrary—it is their bare presence to the

tant energy we should for a while display!

Will Is a Relation between the Mind and Its 'Ideas'

In clo ing in therefore after all these preliminaries upon the more *intimate*

the prevalence once

tion properly stops 1

phenomena following according to physiological *laws* upon *the neural events* to which the idea corresponds The *willing* terminates with the prevalence of the idea and whether the act then follows or not is a matter quite immaterial so far as the willing itself goes I will to write and the act follows I will to sneeze and it does not I will that the distant table slide over the floor towards

[1] In fav r of the view in the text one may con
1 chap IV T H Green *P olegomena to Eth cs* b
Phys ol chap 1 J M rtine u *Types of Eth ca*
II br nch I ch p 1 1 § 3 Against it see Leslie Stephen *Science of Eth cs* chap II § 12 II
Spe cer *Data of Eth cs* §§ 9–15 D G Thompson *Syst m of Psychology* pt IX nd
M nd VI p 6 Also Bain *The Se ses a d the Intellect* pp 18–44 *The Emot ons and The Will* p 436

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We thus find that *we reach the heart of our inquiry into volition when we ask by what process it is that the thought of any given object comes to prevail stably in the mind.* Where thoughts prevail without effort, we have sufficiently studied, in the several chapters on sensation, association, and attention, the laws of their advent before consciousness and of their stay. We will not go over that ground again, for we know that interest and association are the words, let their worth be what it may, on which our explanations must perforce rely. Where, on the other hand, the prevalence of the thought is accompanied by the phenomenon of effort, the case is much less clear. Already in the chapter on attention we postponed the final consideration of voluntary attention with effort to a later place. We have now brought things to a point at which we see that attention with effort is all that any case of volition implies. *The essential achievement of the will, in short, when it is most "voluntary," is to* ATTEND *to a difficult object and hold it fast before the mind.* The so-doing is the *fiat*; and it is a mere physio-

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logical incident that when the object is thus attended to immediate motor con sequences should ensue A *resolve* whose contemplated motor consequences are not to ensue until some possibly far distant future condition shall have been fulfilled involves all the psychic elements of a motor fiat except the word *now* and it is the same with many of our purely theoretic beliefs We saw in effect in the appropriate chapter how in the last resort belief means only a peculiar sort of occupancy of the mind and relation to the self felt in the thing believed and we know in the case of many beliefs how constant an effort of the attention is required to keep them [illegible] on and protect them from displacement [illegible] e p 661)

Effort of at [illegible] *nomenon of will*[2] Every reader must know by his own experience that this is so for every reader must have felt some fiery passion s grasp What constitutes the difficulty for a man laboring under an unwise passion of acting as if the passion were unwise? Certainly there is no physical difficulty It is as easy physically to avoid a fight as to begin one to pocket one s money as to squander it on one s cupidities to walk away from as towards a coquette s door The difficulty is mental it is that of getting the idea of the wise action to stay before our mind at all When any strong emotional state whatever is upon us the tendency is for no images but such as are congruous with it to come up If others by chance offer themselves they are instantly smothered and crowded out If we be joyous we cannot keep thinking of those uncertainties and risks of failure which abound upon our path if lugubrious we cannot think of new triumphs travels loves and joys or if vengeful of our oppressor s community of nature with ourselves The cooling advice which we get from others when the fever fit is on us is the mo [illegible] and exasperating thing in life [illegible] of [illegible] if

[illegible] u ve of course immediate motor consequences of a *quasi* emotional sort changes of breathing of attitude internal peech movements etc. but these movements are not *the objects* resolved on or believed. The movements in common volition are the objects willed

[2] This *volitional* effort pure and simple must be carefully distinguished from the *muscular* effort with which it is usually confounded The latter consists of all [illegible] ings to which a muscular [illegible]

[illegible] ting ng it about That they happen to [illegible] e [illegible] oy muscular activity is a purely accidental circumstance A soldier standing still to be fired at expects disagreeable sensations from h s muscular passivity The action of his will in sustaining the expectation is identical with that required for a painful muscular effort What is hard [illegible] *ng on id a as real* [illegible] needed or where the [illegible] eshness is very great the [illegible] n the idea of mo ement wh ch comes th n and stays Mo e commonly however muscular effo t in olves th fatigue and wet and watch ng the sailo on a [illegible] hardly are his limbs fai ly relaxed when the order to the pumps! again sounds in his ears Shall he can he obey it? Is it not better just to let h s aching body lie and let the ship go down if she will? So he lies on till with a desperate heave of the will at last he staggers to his legs, and to his task gain Again there are insta c s where the fiat demands great vol ti nal effort though the muscular exertion be insignificant e g the g tting out of bed a d bath n e s self on a c ld morning

they once but g
very vital sparl
to the ground

will work and work until they have frozen the

and passion s cue accordin

icy in this cold water bath something which seems so host e to the
of our life so purely negative in Reason when she lays her corpse like finger on our heart and says Halt! give up! leave off! go back! sit down! that it is no wonder that to most men the steadying influence seems for the time being a very minister of death

The strong willed man however is the man who hears the still small voice
d wh when the death bringing consideration comes looks at

expe
th difficult ob ct erelon begins to call up its own congeners and associates

And the will s work is in most cases practically ended when the bare presence to our thought of the naturally unwelcome object has been secured For the mysterious tie between the thought and the motor centres next comes into play and in a way which we cannot even guess at the obedience of the bodily organs follows as a matter of course

In all this one sees how the immediate point of application of the volitional effort lies exclusively in the mental world The whole drama is a mental drama The whole difficulty is a mental difficulty a difficulty with an object of our thought. If I may use the word *idea* without suggesting associationist or Herbartian fables I will say that it is an idea to which our will applies itself an idea which if we let it go would slip away but which we will not let go Consent to the idea s undivided presence this is effort s sole achievement Its only function is to get this feeling of consent into the mind And for this there is but one way The idea to be consented to must be kept from flickering and going out. It must be held steadily before the mind until it *fills* the mind Such filling of the mind by an idea with its congruous associates *is* consent to the idea and to the fact which the idea represents If the idea be that or include that of a bodily movement of our own then we call the consent thus laboriously gained a motor volition For Nature here backs us instantaneously and follows up our inward willingness by outward changes on her own part. She does this in no other instance Pity she should not have been more generous nor made a world whose other parts were as immediately subject to our will!

On page 796 in describing the 'reasonable type' of decision it was said that it usually came when the right conception of the case was found Where however the right conception is an anti impulsive one the whole intellectual ingenuity of the man usually goes to work to crowd it out of sight and to find names for the emergency, by the help of which the dispositions of the moment may sound sanctified and sloth or passion may reign unchecked How many excuses does the drunkard find when each new temptation comes! It is a new brand of liquor which the interests of intellectual culture in such matters oblige him to test moreover it is poured out and it is sin to waste it or others are drinking and it would be churlishness to refuse or it is but to enable him to sleep or just to get through this job of work or it isn t drinking it is because he feels so cold or it is Christmas day or it is a means of stimulating him to make a more powerful resolution in favor of abstinence than any he has hitherto made or it is just this once and once doesn t count etc etc *ad libitum*—it is, in fact anything you like except *being a drunkard That* is the conception that will not stay before the poor soul s attention But if he once gets able to pick out that way of conceiving from all the other possible ways of conceiving the various opportunities which occur if through thick and thin he holds to it that this is being a drunkard and is nothing else he is not likely to remain one long The effort by which he succeeds in keeping the right *name* unwaveringly present to his mind proves to be his saving moral act [1]

Everywhere then the function of the effort is the same to keep affirming and adopting a thought which if left to itself would slip away It may be cold and flat when the spontaneous mental drift is towards excitement or great and arduous when the spontaneous drift is towards repose In the one case the effort has to inhibit an explosive in the other to arouse an obstructed will The exhausted sailor on a wreck has a will which is obstructed One of his ideas is that of his sore hands of the nameless exhaustion of his whole frame which the act of farther pumping involves and of the deliciousness of sinking into sleep The other is that of the hungry sea ingulfing him Rather the aching toil! he says and it becomes reality then in spite of the inhibiting influence of the relatively luxurious sensations which he gets from lying still But exactly similar in form would be his consent to lie and sleep Often it is the thought of sleep and what leads to it which is the hard one to keep before the mind If a patient afflicted with insomnia can only control the whirling chase of his thoughts so far as to think of *nothing at all* (which can be done) or so far as to imagine one letter after another of a verse of Scripture or poetry spelt slowly and monotonously out it is almost certain that here too specific bodily effects will follow and that sleep will come The trouble is to keep the mind upon a train of objects naturally so insipid *To sustain a representation to think* is in short the only moral act for the impulsive and the obstructed for sane and lunatics alike Most maniacs know their thoughts to be crazy but find them too pressing to be withstood Compared with them the sane truths are so deadly sober so cadaverous that the lunatic cannot bear to look them in the face and say Let these alone be my reality! But with sufficient effort as Dr Wigan says

[1] *Cf* Aristotle s *Nicomachean Ethics* bk. vii ch 3 also a discussion of the doctrine of "The Practical Syllogism in Sir A. Grant s edition of this work, 2d ed vol 1 p 212 ff

Such a man can for a time *wind himself up* as it were, and determine that the notions of the disordered brain shall not be manifested. Many instances are on record similar to that told by Pinel where an inmate of the Bicetre, having stood a long cross-examination, and given every mark of restored reason signed his name to the paper authorizing his discharge Jesus Christ and then went off into all the vagaries connected with that delusion. In the phraseology of the gentleman whose case is related in an early part of this [Wigan] w k he had "held himself tight during the examinati n in order to attain his object this once accomplished he let himself down again, and, if even *conscious* of his delusion could not control it. I ha e observed with uch persons that t requires considerable time to wind themselves up to the pitch of complete self-control, that the effort is a painful tension of the mind.

When thrown ff their guard by any accidental remark or worn out by the length f th e he *l t them lves go* and cannot gather themselves up again without agam t examin insanity till gentleman a ... in cherry juice, and he became instantly insane.

To sum it all up in a word *the term nus of the psychological process in voli t on the point to wh ch the will is directly applied is always an idea.* There are a r t ... is the volitional act and the only inward volitional act which we ever perform.

I have put the thing in this ultra-simple way because I want more than any thing else to emphasize the fact that volition is primarily a relation not between our Self and extra mental matter (as many philosophers still maintain) but between our Self and our own states of mind But when a short while ago I spoke of the filling of the mind with an idea as being equivalent to consent to the idea s object I said something which the reader doubtless questioned at the time and which certainly now demands some qualification ere we pass beyond.

The Duality f the Mind pp. 41-42 Another case from the same book (p. 3) A gentleman f respectable birth, excellent educati n, and ample f rtune, engaged in ne f the highest departments f trade, and being ind ced to embark in ne f th plausible speculati ns f th day was tterly ruined. Like ther men h could bear sudden overwhelming reverse better than long successi f petty misf rtunes, and th way in hich he conducted himself the occasi met with unbounded admiratio from his friends. H withdrew however into rigid seclusion, and being lo ger ble t exercise the generosity and indulg the benevolent feelings which had f rmed the happiness f his li made himself substitute for them by daydreams, and gradually f ll int state f irrita ble despondency from which he only gradually recovered with the loss f reason. He w

them with munificent sum, sends it ff to the sufferer and sits down to his dinner with a happy co viction that he has earned th right to little indulgence in t pleasures f th table and yet on serious co versati with ne f his ld friends, he is quite conscious of his real position, but the conviction is so exquisitely painful that *he will t let himself bea it*.

It is unqualifiedly true that if any thought *do* fill the mind exclusively such filling is consent The thought for that time at any rate carries the man and his will with it But it is not true that the thought *need* fill the mind exclusively for consent to be there for we often consent to things whilst thinking of other things even of hostile things and we saw in fact that precisely what distin

a part of what the word will covers it covers also the effort to *consent* to something to which our attention is not quite complete Often when an object has gained our attention exclusively and its motor results are just on the point of setting in it seems as if the sense of their imminent irrevocability were enough of itself to start up the inhibitory ideas and to make us pause Then we need a new stroke of effort to break down the sudden hesitation which seizes upon us and to persevere So that although *attention is the first and funda mental thing in volition* *express consent to the reality of what is attended to* is often an additional and quite distinct phenomenon involved

The reader s own consciousness tells him of course just what these words of mine denote And I freely confess that I am impotent to carry the analysis of the matter any farther or to explain in other terms of what this consent con sists It seems a subjective experience *sui generis* which we can designate but not define We stand here exactly where we did in the case of belief When an idea *stings* us in a certain way makes as it were a certain electric connection with our self we believe that it *is* a reality When it stings us in another way makes another connection with our Self we say *let it be* a reality To the word is and to the words let it be there correspond peculiar attitudes of con sciousness which it is vain to seek to explain The indicative and the imperative moods are as much ultimate categories of thinking as they are of grammar The quality of reality which these moods attach to things is not like other quali ties It is a relation to our life It means *our* adoption of the things *our* caring for them *our* standing by them This at least is what it practically means for us what it may mean beyond that we do not know And the transition from merely considering an object as possible to deciding or willing it to be real the *change from the fluctuating to the stable personal attitude concerning it* from the don t care state of mind to that in which we mean business is one of the most familiar things in life We can partly enumerate its conditions and we can partly trace its consequences especially the momentous one that when the mental object is a movement of our own body it realizes itself outwardly when the mental change in question has occurred But the change itself as a subjective phenomenon is something which we can translate into no simpler terms

The Question of 'Free will'

Especially must we when talking about it rid our mind of the fabulous war fare of separate agents called ideas The brain processes may be agents and the thought as such may be an agent But what the ordinary psychologies call ideas are nothing but parts of the total *object* of representation All that is before the mind at once no matter how complex a system of things and rela

tions it may be is one object for the thou_ht Thus A and B and their mutual incompatibility and the fact that only one-can be-true-or-can become real notwithstandin the-probability-or-desirability-of both may be such a com plex object and where the thou ht is deliberative its object has always some uch form as this When now we pass from deliberation *to decision* that total object undergoes a chan e We e ther dismiss A alto_ether and its relations to B and think of B exclusively or after thinking of both as possibilities we next think that A is impossible and that *B is or forthwith* shall be real In either case a *new* object is before our thought and where effort exists it is where the chan e from the first object to the second one is hard Our thou ht seems to turn in this ca_e like a heavy door on rusty hin es only so far as the effort feels spontaneous it turns not as if by some one helpin but as if by an inward ac tivity born for the occasion of its own

The psychologists who di_cus_ed the muscular sense at the international (P n 1880 agreed at the end that they needed to come to a better

t ity into that of our very *ex ste ce as thinking e t ties* At least so transla e his wo ds B t we saw in Chapter x how hard it is to lay a verifyin_ fin_er plainly upon the thinkin process as such and to di_tinguish it from certain ob jects of the stream M *Fouillee admits this* but I do not think he fully realizes how stron would be the position of a man who should su__est (see p 194) that the feelin of moral activity itself which accompanies the advent of certain h ects before the mind is nothin_ but certain other objects —constrictions

merely to be that of our body and many thinkers would probably thereupon conclude that this settles the claims of inner activ ty and dismisses the whole n tion of such a thin as a superfluity in psycholo cal science

I cannot see my way to so extreme a v ew even althou h I must repeat the confession made on p 191 that I do not *fully* understand how we come to our unshakable belief that thinking exists as a pecial kind of immaterial process alongside f the material processes of the wo ld It is certain however that only by *postulat* such thinking do we make thin_s *currently intelligible* and it is certain that no psychologist has as yet denied the *fact* of thinking the utmost that has been denied bein_ its dynamic power But if we postulate the fact of the thinkin at all I bel eve that we must postulate its power as well nor do I see how we can ri_htly equalize its power with its mere existence and say (as M *Fouillee seems to say*) that *for the* thou ht-p ocess to *go on at all* is an ac ti ty and an activity everywhere the same for certain tep forward in this p ocess seem *prima f c e* to be pas_ive and other steps (as where an object comes with effort) seem *prima facie* to be acti e in a upreme degree If we ad mit therefore that our thou_hts *exist* we ou_ht to admit that they exist after the fashion in which they appear as things namely that supervene upon each

Le Sentiment de l'effort, et la conscience de l'action, in *Revue philo phique* XXVIII, p. 56 Ibid p. 5 7

other sometimes with effort and sometimes with ease the only questions being is the effort where it exists a fixed function of the *object* which the latter imposes on the thought? or is it such an independent variable that with a constant object more or less of it may be made?

It certainly appears to us indeterminate and as if even with an unchanging object we might make more or less as we choose If it be really indeterminate our future acts are ambiguous or unpredestinate in common parlance *our wills are free* If the amount of effort be not indeterminate but be related in a fixed manner to the objects themselves in such wise that whatever object at any time fills our consciousness was from eternity bound to fill it then and there and compel from us the exact effort neither more nor less which we bestow upon it —then our wills are not free and all our acts are foreordained *The question of fact in the free will controversy is thus extremely simple* It relates solely to the amount of effort of attention or consent which we can at any time put forth Are the duration and intensity of this effort fixed functions of the object or are the

abl

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ticularly dirty or cowardly or cruel act it is hard to persuade him in the midst of his remorse that he might not have reined them in hard to make him believe that this whole goodly universe (which his act so jars upon) required and exacted it of him at that fatal moment and from eternity made aught else impossible But on the other hand there is the certainty that all his *effortless* volitions are resultants of interests and associations whose strength and sequence are mechanically determined by the structure of that physical mass his brain and the general continuity of things and the monistic conception of the world may lead one irresistibly to postulate that a little fact like effort can form no real exception to the overwhelming reign of deterministic law Even in effortless volition we have the consciousness of the alternative being also possible This is surely a delusion here why is it not a delusion everywhere?

My own belief is that the question of free will is insoluble on strictly psychologic grounds After a certain amount of effort of attention has been given to an idea it is manifestly impossible to tell whether either more or less of it *might* have been given or not To tell that we should have to ascend to the antecedents of the effort and defining them with mathematical exactitude prove by laws of which we have not at present even an inkling that the only amount of sequent effort which could *possibly* comport with them was the precise amount which actually came Measurements whether of psychic or of neural quantities and deductive reasonings such as this method of proof implies will surely be forever beyond human reach No serious psychologist or physiologist will venture even to suggest a notion of how they might be practically made We are thrown back therefore upon the crude evidences of introspection on the one hand with all its liabilities to deception and on the other hand upon *a priori* postulates and probabilities He who loves to balance nice doubts need be in no hurry to decide the point Like Mephistopheles to Faust he can say to himself *da u hast du noch eine lange Frist* for from generation to generation the reasons adduced on both sides will grow more voluminous and the discussion more refined But if our speculative delight be less keen if the love of a *parti pris* outweighs that

of keepin questions open or if as a French philosopher of genius says *la* , *d d tant de discours* awakens in us craving the

must so fill our mind with the idea of it that it becomes ... present writer does this for the alternative of freedom but since the grounds of his opinion are ethical rather than psychological he prefers to exclude them from the present book

A few words however may be permitted about the logic of the question The most that any argument can do for determinism s to make it a clear and seductive conception which a man is foolish not to espouse so long as he stands by the great scientific postulate that the world must be one unbroken fact and that prediction of all things without exception must be ideally even if not actually possible It is a *moral* postulate about the Universe the postulate that *what ought to be can be and that bad acts cannot be fated but that good ones must be possible in the r place* which would lead one to espouse the contrary view But when scientific and moral postulates war thus with each other and objective proof is not to be had the only course is voluntary choice for scepticism itself if systematic is also voluntary choice If meanwhile the will *be* undetermined it would seem only f tting that the belief in its indetermination should be voluntarily chosen from amongst other possible beliefs Freedom s first deed should be to affirm itself We ought never to hope for any other method of getting at the truth if indeterminism be a fact Doubt of this particular truth will therefore probably be open to us to the end of time and the utmost that a believer in free will can *ever* do will be to show that the deterministic arguments are not coercive That they are seductive I am the la t to deny nor do I deny that effort may be needed to keep the faith in freedom when they press upon it upright in the mind

There is a *fatalistic argument* for determinism however which is radically vicious When a man has let himself go time after time he eas ly becomes impressed *with the enormously preponderating influence* of circumstances hereditary habits and temporary bod ly dispositions over what might seem a spontaneity born for the occa ion All is fate he then says all is resultant of what pre exists Even if the moment seems original it is but the instable molecules pass vely tumbl ng in th ir preappointed way It is hopeless to resist the drift vain to look for any new force coming in and less perhaps than anywhere else under the sun is there anything really *mine in the decis ons which* I make This is really no argument for simple determinism There runs through out it the sense of a force which might make things otherwise from one moment to another if it were only strong enou h to break the tide A person who feels the *impotence* of free effort in this way has the acutest notion of what is meant by it and of its possible independent power How else could he be so conscious of its absence and of that of its effects? But genuine determini m occupies a totally d fferent ground not the *impotence* but the *unthinkab lity* of free will is

They ll be I d indicated, I somewh t pop lar f rm, In lect 'Tl Dilemma I Determinism p blished in th *Unit a R iew* (I Bo t) f Septemb 884 (v I xxii, p 93)

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tions are resultants of interests and associations whose strength and sequence are mechanically determined by the structure of that physical mass his brain and the general continuity of things and the monistic conception of the world may lead one irresistibly to postulate that a little fact like effort can form no real exception to the overwhelming reign of deterministic law Even in effortless volition we have the consciousness of the alternative being also possible This is surely a delusion here why is it not a delusion everywhere?

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or keeping questions open, or if, as a French philosopher of genius says, "l'[illegible] de [illegible] [illegible] de [illegible]" awakens in us, then we, taking the risk of error on our head, we must project upon one of the alternatives viewed the attribute of reality for us; we must so fill our mind with the idea of it that it becomes our settled creed. The present writer does this for the alternative of freedom, but since the grounds of his opinion are ethical rather than psychological, he prefers to exclude them from the present book.

A few words, however, may be permitted about the logic of the question. The most that any argument can do for determinism is to make it a clear and seductive conception, which a man is foolish not to espouse, so long as he stands by the great scientific postulate that the world must be one unbroken fact, and that prediction of all things without exception must be ideally, even if not actually, possible. It is a moral postulate about the Universe, the postulate that *what ought to be can be, and that bad acts cannot be fated, but that good ones must be possible in their place*, which would lead one to espouse the contrary view. But when scientific and moral postulates war thus with each other and objective proof is not to be had, the only course is voluntary choice, for scepticism itself, if systematic, is also voluntary choice. If, meanwhile, the will *be* undetermined, it would seem only fitting that the belief in its indetermination should be voluntarily chosen from amongst other possible beliefs. Freedom's first deed should be to affirm itself. We ought never to hope for any other method of getting at the truth if indeterminism be a fact. Doubt of this particular truth will therefore probably be open to us to the end of time, and the utmost that a believer in free-will can *ever* do will be to show that the deterministic arguments are not coercive. That they are seductive, I am the last to deny; nor do I deny that effort may be needed to keep the faith in freedom, when they press upon it, upright in the mind.

There is a [illegible] *argument* for determinism, however, which is radically vicious. When a man has let himself go time after time, he easily becomes impressed with the enormous preponderance of the influence of circumstances, hereditary instincts, and temporary bodily dispositions over what might seem a spontaneous bent for the occasion. "All is fate," he then says; "all is resultant of what pre-exists. Even if the moment seems original, it is but the [illegible] [illegible] [illegible] [illegible] in their preappointed way. It is hopeless to resist the drift, vain to look for any new force coming in; and less, perhaps, than anywhere else under the sun is there anything really made in the decisions which I make." This is really no argument for simple determinism. There runs throughout it the sense of a force which might make things otherwise from one moment to another, if it were only strong enough to break the line. A person who feels the [illegible] of free effort in this way has the acutest notion of what is meant by it, and of its possible independent power. How else could he be so conscious of its absence and of that of its effects? But genuine determinism occupies a totally different ground; not the *impotence* but the *unthinkability* of free-will is

They will be found urged, in somewhat popular form, in a lecture on "The Dilemma of Determinism," published in the Unitarian Review (of Boston) for September 1884 (vol. XXII, p. [illegible]3).

what it affirms It admits something phenomenal *called* free effort which *seems* to breast the tide but it claims this as a *portion of the tide* The variations of the effort cannot be independent it says they cannot originate *ex nihilo* or come from a fourth dimension they are mathematically fixed functions of the ideas themselves which are the tide Fatalism which conceives of effort clearly enough as an independent variable that might come from a fourth dimension if it *could* come but that does *not* come is a very dubious ally for determinism It strongly imagines that very possibility which determinism denies

But what quite as much as the inconceivability of absolutely independent variables persuades modern men of science that their efforts must be predetermined is the continuity of the latter with other phenomena whose predetermination no one doubts Decisions with effort merge so gradually into those without it that it is not easy to say where the limit lies Decisions without effort merge again into ideo motor and these into reflex acts so that the temptation is almost irresistible to throw the formula which covers so many cases over absolutely all Where there is effort just as where there is none the ideas themselves which furnish the matter of deliberation are brought before the mind by the machinery of association And this machinery is essentially a system of arcs and paths a reflex system whether effort be amongst its incidents or not The reflex way is after all the universal way of conceiving the business The feeling of *ease* is a passive result of the way in which the thoughts unwind themselves Why is not the feeling of effort the same? Professor Lipps in his admirably clear deterministic statement so far from admitting that the feeling of effort testifies to an increment of force exerted explains it as a sign that force is lost We speak of effort according to him whenever a force expends itself (wholly or partly) in neutralizing another force and so fails of its own possible outward effect The outward effect of the antagonistic force however also fails in corresponding measure so that there is no effort without counter effort and effort and counter effort signify only that causes are mutually robbing each other of effectiveness [1] Where the forces are ideas both sets of them strictly speaking are the seat of effort—both those which tend to explode and those which tend to check them We however call the more abundant mass of ideas *ourselves* and talking of its effort as *our* effort and of that of the smaller mass of ideas as the *resistance* [2] we say that our effort sometimes overcomes the resistances offered by the inertias of an obstructed and sometimes those presented by the impulsions of an explosive will Really both effort and resistance are ours and the identification of our *self* with one of these factors is an illusion and a trick of speech I do not see how anyone can fail (especially when the mythologic dynamism of separate ideas which Professor Lipps cleaves to is translated into that of brain processes) to recognize the fascinating simplicity of some such view as his Nor do I see why *for scientific purposes* one need give it up even if indeterminate amounts of effort really do occur Before their indeterminism science simply *stops* She can abstract from it altogether then for in

[1] See *Grundtatsachen des Seelenlebens* pp 594–95 and compare the conclusion of our own chapter on Attention pp 291–95

[2] Thus at least I interpret Prof Lipps's words *W[ir] [m]ussen uns natu[r]ge[m]ass n[u]r [je]d[e]m Streben u[n]s[e]re[m] mehr akt[i]v [ge]g[e]n[üb]er ...* g[e]n[e]s *Ich b[ei] d[e]n Str[e]b[en] b[e]t[h]e[i]l[i]gt* (p. 601)

the impulses and inhibitions with which the effort has to cope there is already a larger field of uniformity than she can ever practically cultivate Her previsions will never foretell even if the effort be completely predestinate the actual way in which each individual emergency is resolved Psychology will be Psychology and Science Science as much as ever (as much and no more) in this world whether free-will be true in it or not Science however must be constantly reminded that her purposes are not the only purposes and that the order of uniform causation which she has use for and is therefore right in postulating may be enveloped in a wider order on which she has no claims at all

We can therefore leave the free will question altogether nt f

And al

one idea might be *mo all* d *historic lly m men*

m t law r th y lo
ect is sheer nonse se
(y 1, p 503) —are bene th
tcism M pe w k lik all th th w k th s bject t eat f those
g l d ti ns f *p ssibl* co d t w thin wh ch ll r al decisi ns m t fall n mat
t b h th ir ff rt be small rr t If l sely psy hical hange s may f m
nd bi gr phies will never be writt in
y be m
ll d m ls bo l l d t m istic
s *C mic Philo phy* (pt n hap x 1)
necessa ly f ll w that w ca t i f
ng If th f re a m has
pect g the t my tha th
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ing T w t hist ry y method f rnished by th f ll doctrin ld be tt rly
impossibl —All this mes f m M Fisk t distinguishi g betw th possibles

tous yet if considered *dynamically* it would be an operation am gst those *physiological infinitesimals which calculat on*

But whilst elim n t as one
ay one word
portant character which the phe-
r a sumes in our own eyes as individual men Of course we measure ourselves by many standards Our strength and our intelligence our wealth and even our good luck are things which warm our heart and make us *feel ourselves a match for life* But deeper than all such things and able to suffice unto itself without them is the sense of the amount of effort which we can put forth Those are after all but effects products and reflections of the outer world within But the effort seems to belong to an altogether different realm as if it were the substantive thing which we *are* and those were but externals which we *carry* If the searching of our heart and reins be the purpose of this human drama then what is sought seems to be what effort we can make *He who can make none is but a shadow he who can make much* is a hero

The huge world that girdles us about puts all sorts of questions to us and tests us in all sorts of ways Some of the tests actions that are easy and some of the que ulated words But the
ut the dumb turning of
t heartstrings as we say *Yes I will even have it* s when a dreadful object is presented or when life as a whole turns up its dark abysses to our view then the worthless ones among us lose their hold on the situation altogether and *either escape from its difficulties by averting their* attention or if they cannot do that collapse into yielding masses of plaintiveness and fear The effort required for facing and co ts is beyond their power to m too
for
t t for that losing its hold upon
t vorld thus finds in the heroic man its worthy match and *mate* and the effort which he is able to put forth to l
keep his heart unshak n

l

l itner in the theoretic nor in
t ere do we care for or no help to those who have no head for risks dge Our religious life lies more
he perilous edge But just as our
so our faith is apt to be as Max
says a faith in some one else s faith We draw new life from the *heroic example The prophet has drunk more deeply than anyone of the cup*

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which really tempt a man nd *tho e which tempt him not at all* Free will like psychology deals with the former possibles exclusi ely

Thus not only [illegible] depend on the effort which we can make. *Will you or won't you have it so?* is the most probing question we are ever asked; we are asked it every hour of the day, and about the largest as well as the smallest, the most theoretical as well as the most practical, things. We answer by *consents* or *non-consents* and not by words. What wonder that these dumb responses should seem our deepest organs of communication with the nature of things! What wonder if the effort demanded by them be the measure of our worth as men! What wonder if the amount which we accord of it be the one strictly underived and original contribution which we make to the world!

The Education of the Will

The education of the will may be taken in a broader or a narrower sense. In the broader sense, it means the whole of one's training to moral and prudential conduct, and of one's learning to adapt means to ends, involving the association of ideas in all its varieties and complications, together with the power of inhibiting impulses irrelevant to the ends desired, and of initiating movements contributory thereto. It is the acquisition of these latter powers which I mean by the education of the will in the narrower sense. And it is in this sense alone that it is worth while to treat the matter here.

Since a willed movement is a movement preceded by an idea of itself, the problem of the will's education is the problem of how the idea of a movement can arouse the movement itself. This, as we have seen, is a secondary kind of process; for framed as we are, we can have no *a priori* idea of a movement, no idea of a movement which we have not already performed. Before the idea can be generated, the movement must have occurred in a blind, unexpected way and left its idea behind. *Reflex, instinctive, or random execution* of a *movement* must, in other words, precede its voluntary execution. Reflex and instinctive movements have already been considered sufficiently for the purposes of this book. Random movements are mentioned so as to include *quasi*-accidental reflexes from other causes, or movements possibly arising from such overflow [illegible] in special centres as Prof. Bain postulates in his explanation of those spontaneous discharges by which he sets such great store in his derivation of the voluntary life.

Now how can the sensory process which a movement has previously produced discharge when excited again into the centre for the movement itself? On the movement's original occurrence the motor discharge came first and the sensory process second; now in the voluntary repetition the sensory process (excited in weak or ideational form) comes first, and the motor discharge comes second. To tell how this comes to pass would be to answer the problem

On the education of the Will from a pedagogic point of view see an article by G. Stanley Hall in the *Princeton Review* for November [illegible], and some bibliographic references there contained.

See, in his *The Emotions and the Will*, "The Will," chap. I. I take the name of "random" movements from Sully, *Outlines of Psychology*, p. 593.

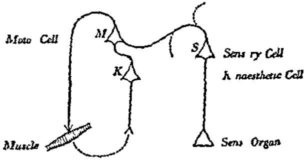
of the education of the will in physiological terms Evidently the problem is that of the formation of *new paths* and the only thing to do is to make hypoth eses till we find some which seem to cover all the facts

How is a fresh path ever formed? All paths are paths of discharge and the discharge always takes place in the direction of least resistance whether the cell which discharges be motor or sensory The *connate* paths of least resistance are the paths of instinctive reaction and I submit as my first hypoth sis that *these paths all run one way that is from*
cells and from motor c ll

ges or normally tends to
be called the forward
ypothesis but really it is an indubitable truth No impression or idea of eye ear or skin comes to us without occasioning a move ment even though the movement be no more th ... on of the sense organ and all ... ive their
hich we
at pri
ne brain run towards ...
at there they run out and ...
this point of view
significance All c ... e of the Rolandic region those nearest the ... of the funnel the motor cells *par excellence*

A corollary of this law is that sensory cells do not awaken each oth nately that is that no one sensible property
vance of experience to awaken in us the ide.
which in the nature of things may go with it ... is *no a priori calling up of one idea by another* the only *a priori* couplings are of ideas with movements All suggestions of one sensible fact by another take place by secondary paths which experience has formed

The diagram (Fig 87) shows what happens in a nervous system ideally re-



c path discharges the motor

ic and must n t be upp sed to
r proc sses. The latter accord g
e base of the c ll and each cell has but one They alone

thetic or of a remote sensation (ee a P
charges into M If this were the entire nervous mechanism the movement once begun would be self maintain ng and would stop only when the parts were exhausted And this according to M Pierre Janet is what actually happens in *catalepsy* A cataleptic patient is anæsthetic speechless motionless Consciousness so far as we can judge is abol bed Nevertheless the limbs will retain whatever position is impressed upon them from without and retain it so long that if it be a strained and unnatural position the phenomenon is regarded by C h f m cl is e tests against hypnotic subjects shammin

I ore e the outlying ideational processes in the t at

t action Inh bition is the efore not an occas onal accident t is an essential and unremitti g element of our cerebral life It is interesting to note that Dr Mercier by a d fferent path of reasoning is also led to conclu le that we owe to outside inh bitions exclusively our power to arre t a movement once begun [1]

One great inhibiter of the discharge of K into M seems to be the painful or otherwise di pleasin quality of the sensation itself of K and conversely when this sensation is distinctly pleasant that fact tends to further K s discharge into M and to keep the primord al motor c rcle agoing Tremendous as the part is wh ch pleasure and pain play in our psychic life we must confess that absolutely nothing is known of their cerebral conditions It is hard to imag ne them as hav in pecial centres *it is harder still to invent peculiar forms of process in each* and e ery centre to wh ch these feel ngs may be due And let one try as one w ll to ep esent the cereb al activity in exclusively mechan cal terms I for one find it qu te impossible to enumerate what seem to be the facts and yet to make no mention of the psychic side wh ch they possess However it be with other d a age currents and discha ges the drainage currents and discharges of the brain are not purely physical facts They are *psycho pl ys cal* facts and the spiritual quality of them seems a codeterminant of their mechanical effectiveness If the mechanical activities in a cell as they increase give pleasure they seem to increase all the more rapidly for that fact if they give displeasure the

f rm n us t k Th d ll f lso d t nd th t f the hypothetical nstru ti ns wh ch I m k f m w t th d f th ch pt p posed as d finite cc ts f wh t h ppe All I aim t t m k t cl in som m less ym bol fashi th t th f rm ti f w p th th learning of h b ts t is l s m mechanical way ea bl C mpar p 53 te.

[1] *Th N rv us Sy t m nd th M d* (888) pp 75 76

displeasure seems to damp the activities The psychic side of the phenomenon thus seems somewhat like the applause or hissing at a spectacle to be an encouraging or adverse *comment* on what the machinery brings forth The soul *presents* nothing herself *creates* nothing is at the mercy of the material forces for all *possibilities* but amongst these possibilities she *selects* and by reinforcing one and checking others she figures not as n ... ienon but as something from which ıt ... ore never hesı ... ıctly mech

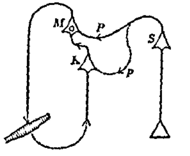
ι ... e caping f om

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... agreeableness of the feeling ... the conditions under which new paths may be formed Potentialities of new paths are furnished by the fi ... connect the sensory cells amongst them ı ... ly pervious and ... y to state as fol

... *ory cell in the forward direction[2] tends to ... the cells lying behind the discharging one of whatever tension they may possess The drainage from the rearward cells is what for the first time makes the fibres pervious The result is a new formed path running from the cells which were rearward to the cell which was forward on that occasion which path if on future occasions the rearward cells are independently excited will tend to carry off their activity in the same direction so as to excite the forward cell and will deepen itself more and more every time it is used*

Now the rearward cells so far stand for all the sensory cells of the brain other than the one which is discharging but such an indefinitely broad path would practically be no better than no path so here I make a third hypothesis which taken together with the others seems to me to cover all the facts It is that *the deepest paths are formed from the most drainable to the most draining cells* that *the most drainable cells are those which have just been discharging* and that *the most draining cells are those which are now discharging or in which the tension is rising towards the point of discharge*[3] Another diagram Fig 88 will make the matter clear Tak th



ι ... through the dotted line *p* it

... pp 90 93 [2] That is the direction towards the motor cells.

[3] This b in scheme seems oddly enough to give a certa n basis of reality to th se hideously fabulous perfo mances of the Herbart n *Hemmungen* He ba t says th t when one idea is inh b ted by an ther t fuses with that other and the eaft r helps it to ascend into consciousness Inhibition is thus the basis of association in both schemes fo the draining of which the te t speaks is tantamount t n hib tion of th acti ity of the cells wh ch are drained wh ch inhibition make the inhibited re ive the inhibiter on lat r occasions

will according to our third hypothesis drain S (which in the supposed case has just discharged into M by the connate path P and caused the muscular contraction) and the result is that p will now remain as a new path open from S to K. When next S is excited from without it will tend not only to discharge into M but into K as well. K thus gets excited directly by S *before* it gets excited by the incoming current from the muscle or translated into psychic terms *when a sensation has once produced a movement in us the next time we have the sensation it tends to suggest the idea of the movement even before the movement occurs*

The same principles also apply to the relations of K and M. M lying in the forward direction drains K and the path KM even though it be no primary or connate path becomes aroused in any way whatever still it will tend to discharge *the idea of the movement antecedent condition to the*

Here then we have the answer to our original question of how a sensory process which the first time it occurred was the effect of a movement can later figure as the movement s cause

It is obvious on this scheme that the cell which we have marked K may stand for the seat of either a resident or a remote sensation occasioned by the motor discharge It may *indifferently* be a tactile a visual or an auditory cell The idea of how the arm *feels* when raised may cause it to rise but no less may the idea of some *sound* which it makes in rising or of some *optical* impression which it produces Thus we see that the mental cue may belong to either of various senses and that what our diagrams lead us to infer is what really happens namely that *in our movements such as that of speech for example in some of us it is the tactile in others the acoustic Effectsbild or memory image which seems most concerned in starting the articulation* (pp 35-37) *The primitive* starters however of all our movements are not *Effectsbilder* at all but sensations and objects and subsequently ideas derived therefrom.

Let us now turn to the more complex and serially concatenated movements which oftenest meet us in real life The object of our will is seldom a single muscular contraction it is almost always an orderly sequence of contractions ending with a sensation which tells us that the goal is reached But the several contractions of the sequence are not each distinctly willed each earlier one seems rather by the sensation it produces, to call its follower up after the fashion described in Chapter vi where we spoke of habitual concatenated movements being due to a series of secondarily organized reflex arcs (p 6) The first contraction is the one distinctly willed and after willing it we let the rest of the chain rattle off of its own accord How now is such an orderly concatenation of movements originally learned or in other words how are paths formed for the first time between one motor centre and another so that the discharge of the first centre makes the others discharge in due order all along the line?

See the luminous passage in Munsterberg *Die Willenshandl* I pp 44-45

The phenomenon involves a rapid alternation of motor discharges and resultant afferent impressions for as long a time as it lasts They must be associated in one definite order and the order must once have been *learned* i e it must have been picked out and held to more and more exclusively out of the many other random orders which first presented themselves The random afferent impressions fell out those that felt right were selected and grew together in the chain A chain which we actively teach ourselves by stringing a lot of right feeling impressions together differs in no essential respect from a chain which we passively learn from some one else who gives us impressions in a certain order So to make our ideas more precise let us take a particular concatenated movement for an example and let it be the recitation of the alphabet which someone in our childhood taught us to say by heart

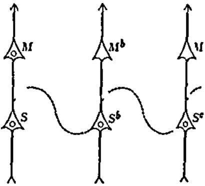


FIG 89

What we have seen so far is how the idea of the sound or articulatory feeling of A may make us say A that of B B and so on But what we now want to see is *why the sensation that A is uttered should make us say B why the sensation that B is uttered should make us say C and so on*

To understand this we must recall what happened when we first learned the letters in their order Someone repeated A B C D to us over and over again and we imitated the sounds Sensory cells corresponding to each letter were awakened in succession in such wise that each one of them (by virtue of our second law) must have drained the cell just previously excited and left a path by which that cell tended ever afterwards to discharge into the cell that drained it Let S S^b S in figure 89 stand for three of these cells Each later one of them as it discharges motorwards draws a current from the previous one S^b from S and S from S^b Cell S^b having thus drained S if S ever gets excited again it tends to discharge into S^b whilst S having drained S^b S^b later discharges into S etc etc —all through the dotted lines Let now the idea of the letter A arise *in the mind or in other words* let S be aroused what happens? A current runs from S not only into the motor cell M for pronouncing that letter but also into

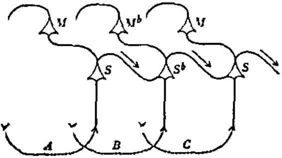


FIG 90

the cell S^b When a moment later the effect of M s discharge comes back by the afferent nerve and re-excites S this latter cell is inhibited from discharging

d al motor circle (which in this case

a

M^b is under the exist ng conditions inc

citement The result is that M^b discharges and the letter B is pronounced whilst at the same time S receives some of S^b s overflow and a moment later when the sound of B enters the ear discharges into the motor cell for pronouncing C by a repetit on of the same mechanism as before and so on *ad libitu n*

F f n es rs involved

t

t

mechanical reason might lie in a general law that cel s e u

citement is in a rising phase are stronger drainers than cells l ke M which have just dischar ed or it might lie in the fact that an irradiation of the current beyond S^b into S and M has already begun also an l in a still farther law that drainage tends in the direction of the widest irradiations Either of these uj positions would be a suft cient mechanical reason why having once said \ we should not say it again But we must not forget that the process has a psychical side nor close our eyes to the possib lity that the *so t of feel ng* aroused by incip ent currents may be the reason v hy *certa n of them are in tantly inhibited* and others helped to flow There is no doubt that before we have uttered a single letter the general intention to recite the alphabet is already there nor is there any doubt that to that intention corre ponds a widespread premon tory rising f tens ons along the entire sy tem of cells and fibres v hich are later to be aroused So long as this rise of tens ons *feels good* so lon every current which increases it is furthered and every current which diminishes it is checked and this may be the chief one of the exist ng cond tions which make the drainage-channel from S to S^b temporarily so strong

The new paths bet een the sensory cells of which e have studied the forma tio are paths of association and we now see why associations run always in the for ard direction why for example we cannot say the alphabet backward and why although S^b d scharges into S there is no tendency for S to discharge into S^b or at least no more than for it to discharge into S [2] The first formed paths had according to the principles which we invoked to run fr m cells that had just discharged *to those that were* discharging and now to get currents to run *the other way* we must go through a new learning of our letters with their order reversed There will *then* be two sets of

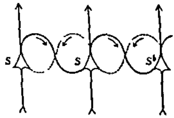


FIG 9

L Lang d M nst berg p nments w th sh rten d m scul eact time (se pag 8) h w h w p t t f ct dynami lly this anticip t ry p ep tlo of h I set f possibl drainag channels is.

E as th p f f th p g passing th gh my h ds I \ f th *Zeit krift fur P y h l g Phy l g d S* g in which th irrep ss ble y g

reception by the ear of the letters in the order of C B A

The same principles will explain the formation of new paths successively con catenated to no matter how great an extent but it would obviously be folly to pretend to illustrate by more intricate ex amples I will therefore only bring back the case of the child and flame (p 16) to show how easily it admits of explanation as a purely cortical transaction (p 52) The sight of the flame stimulates the cortical centre S^1 which discharges by an instinc tive reflex path into the centre M^1 for the grasping movement This movement produces the feeling of burn as its effects come back to the centre S^2 and this centre by a second connate path discharges into M^2 the centre for withdrawing the hand The movement of withdrawal stimulates the centre S^3 and this as far as we are concerned is the last thing that happens Now the next time the child sees the candle the cortex is in possession of the secondary paths which the first experience left behind S^2 having been stimulated immediately after S^1 drained the latter and now S^1 discharges into S^2 before the discharge of M^1 has had time to occur in other words the sight of the flame suggests the idea of the burn be fore it produces its own natural reflex effects The result is an inhibition of M^1 or an overtaking of it before it is completed by M^2—The characteristic physi ological feature in all these acquired systems of paths lies in the fact that the new formed sensory irradiations keep *draining things forward* and so brea ing up the motor circles which would otherwise accrue But even apart from cat alepsy we see the motor circle every now and then come back An infant learning to execute a simple movement it will without regard to other move ments beyond it keeps repeating it till tired How reiteratively they babble each new learned word! And we adults often catch our selves reiterating some meaningless word over and over again if by chance we once begin to utter it absent mindedly that is without thinking of any ulterior train of words to which it may belong

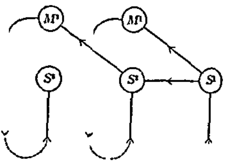


FIG 92

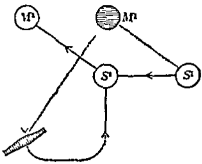


FIG 93

One more observation before closing these already too protracted physiological specula tions Already (page 47) I have tried to

Munsterberg publ hes e per ments to show th t there is n associati n between uc essi e ideas ap rt f om int vening mo ements As my e pl nat ons h ve assumed that n lier exc ted *senso y* cell dr ins a l ter ne h s experime ts a d nfer nce would if ound upset all my hypotheses I therefore ca (at th s l t moment) o ly ref r the read r to Herr M s article hoping to review the subject again myself in another place

shadow forth a reason why collateral innervation should establish itself after loss of brain tissue and why incoming stimuli should f nd their way out again after an interval by their former paths I can now explain this a little better Let S be the do s hearing-centre when he receives the command Give your paw This *used* to discharge into the motor centre M of whose discharge S^1 represents the kinæsthetic effect but now M^1 has been destroyed by an operation so that S discharges as it can into other movements of the body whimpering raising the wrong paw etc The kinæsthetic centre S^1 meanwh le has been awakened by the order S and the poor animal s mind tin les with expectation and desire of certain incoming sensations which are entirely at variance with those which the really exe ed mo m nts give None of the latter sensations arouse a motor circle fo
accident S^1 and S^2
paw is again gi en
there are no inhibitions and the motor circle is
o er and over again and the path from the one spot to the other is so much deepened that at last it becomes organized as the regular channel of efflux when S^1 is aroused No other path has a chance of being organized in like degree

association pathways either of them possible between the sensible cells I represent them in Fig 91 leaving out the motor features for simplicity s sake The dotted lines are the paths in the backward direction, newly organized from the reception by the ear of the letters in the order of C B A

The same principles will explain the formation of new paths successively con catenated to no matter how great an extent but it would obviously be folly to pretend to illustrate by *more intricate* ex amples I will therefore only bring back the case of the child and flame (p 16) to show how easily it admits of explanation as a purely cortical transaction (p 52) The sight of the flame stimulates the cortical centre S^1 which discharges by an instinc *tive reflex path into the centre* M^1 *for* the grasping movement This movement produces the feeling of burn as its effects come back to the centre S^2 and this centre

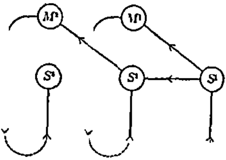


FIG 92

by a second connate path discharges into M^2 the centre for withdrawing the hand The movement of withdrawal stimulates the centre S^3 and this as far as we are concerned is the last thing that happens Now the next time the child *sees the candle the cortex is in possession of the secondary paths which the first* experience left behind S^2 having been stimulated immediately after S drained the latter and now S^1 discharges into S^2 before the discharge of M^1 has had time to occur in other words the sight of the flame suggests the idea of the burn before it produces its own natural reflex effects The result is an inhibition of M^1 or an overtaking of it before it is completed by M^2 —The characteristic physi ological feature in all these acquired systems of paths lies in the fact that the *new formed sensory irradiations* keep *draining things forward* and so brea ing up the motor circles which would otherwise accrue But even apart from cat alepsy we see the motor circle every now and then come back An infant learning to execute a simple movement at will without regard to other move ments beyond it keeps repeating it till tired How reiteratively they babble each new learned word! And we adults often catch our selves *reiterating some meaningless word* over and over again if by chance we once begin to utter it absent mindedly that *is without* thinking of any ulterior train of words to which it may belong

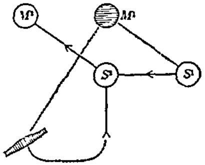


FIG 93

One more observation before closing these already too protracted physiological specula tions Already (page 47) I have tried to

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Munsterberg publ shes exper ments to show that there is n associati n between success e ideas a] ... A m e nl at ons have assumed that an l er excited ... all my l ... article

Some operators appear to be more successful than others in gettin control of their subjects I am informed that Mr Gurney (who made valuable contribu tions to the ... le himself to hypnotize and had to use for l ... bault claim ... Stockholm ... failed to u ... the person ... that the subject should conf dently ex ... on the operator s tact in interpretin, gi e the right commands and crowd it on ... moments These condit ons account for the fact that operators grow more suc cessful the more they operate Bernheim says that whoever does not hypn tize 80 per cent of the persons whom he tries has not yet learned to operate as he should Whether certain operators have over and above this a peculiar ma netic power is a question which I leave at present undecided Children under three or four and insane persons especially idiots are unusually hard to hypnotize This seems due to the impossibility of getting them to fix their attention continuously on the idea of the coming trance All a es above infancy are probably equally hypnotizable as are all races and both sexes A certain amount of mental trainin sufficient to aid concentration of the attention seems a favor able condition and so does a certain momentary indifference or passivity as to the result Nati e tren th or weakness of will have absolutely nothin to do with the matter Frequent trances enormously increase the usceptib lity of a subject and many who resist at first succumb after se eral trials Dr M ll says he has more than once succeeded after forty fru tless attempts Some experts are of the opinion that every one is hypnotizable essentially the only dif culty being the more habitual presence in some individuals of hinderin, mental preoccupations which however may suddenly at some moment be removed

The trance may be dispelled instantaneously by saying in a rousing vo ce All right wake up! or words of similar purport At the Salpetriere they awaken subjects by blowing on their eyelids Upward passes have an awaken in effect sprinkling cold water d tto Anythin will awaken a patient who ex pects to be awakened by that thin Tell him that he will wake after counting fi and he will do so Tell him to waken in five minutes and he i very likely to

Theories about the Hypnotic State

be

sa

Certain f cts w uld seem t point that way Cf g th case f th man described by P Despine, *Étud cient fiq ur le m mbulism* p 86 ff

Chapter XXVII

HYPNOTISM

Modes of Operating, and Susceptibility

THE hypnotic mesmeric or magnetic trance *can be induced in vari ous ways* each operator having his pet method The simplest one is to leave the subject seated by himself telling him that if he close his eyes and relax his mus cles and as far as possible think of vacancy in a few minutes he will go off On returning in ten minutes you may find him effectually hypnotized Braid used to make his subjects look at a bright button held near their forehead until their eyes spontaneously closed The older mesmerists made passes in a down ward direction over the face and body but without contact Stroking the skin of the head face arms and hands especially that of the region round the brows and eyes will have the same effect Staring into the eyes of the subject until the latter droop making him listen to a watch s ticking or simply making him close his eyes for a minute whilst you describe to him the feeling of falling into sleep talk sleep to him are equally efficacious methods in the hands of some operators whilst with trained subjects any method whatever from which they have been led by previous suggestion to expect results will be successful[1] The touching of an object which they are told has been magnetized the drinking of magnetized water the reception of a letter ordering them to sleep etc are means which have been frequently employed Recently M Liegeois has hypno-tized some of his subjects at a distance of 1½ kilometres by giving them an inti mation to that effect through a telephone With some subjects if you tell them in advance that at a certain hour of a certain day they will become entranced the prophecy is fulfilled Certain hysterical patients are immediately thrown into hypnotic catalepsy by any violent sensation such as a blow on a gong or the flashing of an intense light in their eyes Pressure on certain parts of the body (called *ones hypnogènes* by M Pitres) rapidly produces hypnotic sleep in some hysterics These regions which differ in different subjects are oftenest found on the forehead and about the root of the thumbs Finally persons in or dinarv sleep may be transferred into the hypnotic condition by verbal intima tion or contact performed so gently as not to wake them up

[1] It hould be said that the methods of leaving the pati nt to himself a d that of the simple verbal suggestion of sleep (the so called Na cy method int oduc d by Liébault of that pla e) seem where er applicable to b the best as they enta l n n of th fter c e e ces wh ch occasionally follow upon stra n ng his eyes A new p ti nt sho ld not be put th o gh a great variety of diff rent suggestio s in mmediate successi n He should b waked up f om time to time and then rehypnotized to id m t l conf on and e cit m t Before finally waking a subj ct you should *do* h t ver d lusive sug gest o s you may have implanted n h m by telli g him that they all g ne etc nd that you are no g ing to estore him to h s n tural st te Headache l g or etc wh ch some times foll w the first trance or two must be banished t the utset by the operator stro gly assu n the subject that such things *ev* come fr m hyp tism th t the subject *must ot* have them etc.

produced by pressure on the lower cervical vertebræ or on the epi astrium *Aphasia* is brought about by rubbing the head over the region of the speech centre Pressure behind the occiput determines *movements of imitation* Heidenhain describes a number of cu mat e ten lencies to movement which are brought about by stroking
other symptoms have been fr
hands brilliant and congested eyes ... to p — — —
spasm of the accommodation are also reported

The theory of Suggest on denies that there is any special hypnotic *state* worthy of the name of trance or neurosis. All the symptoms above described as well as those to be described hereafter are results of that mental usceptibility which we all to some degree possess of yielding assent to outward suggestion of affirming what we strongly concei e and of acting in accordance with what we are made to expect The bodily symptoms of the Salpetriere patients are all of them results of expectation and trainin The first patients accidentally did certain things which their doctors thought typical and caused to be repeated The subsequent subjects caught on and followed the established tradition. In proof of this the fact is urged that the class cal three stages and their grouped symptoms have *only* been reported as pontaneously occurrin so far at the Salpetriè e though they may be superinduced by deliberate suggestion in patients anywhere found The ocular sympt ms the flushed face accelerated breathin etc. are said not to be symptoms of the passage into the hypnotic state as such but merely consequences of the strain on the eyes when the method of looking at a bright object is used They are absent in the subjects at Nancy where simple verbal suggestion is employed The various reflex effects (aphasia echolalia im tation etc) are but habits induced by the influence of the operator who unconsciously urges the subject into the direction in which he would prefer to have him go The influence of the magnet the oppos te effects of pward and downward passes etc. are similarly explained Even that sleepy and inert condition the advent of which seems to be the prime condit on of farther symptoms be ng developed is said to be merely due to the fact that the mind expects it to come whilst ts influence on the other symptoms is not physiological so to speak but psychical its own easy realization by suggest on simply encouragin the subject to expect that ulter or suggest ons will be real

pass e to suggestion from without The trance itself is only one of the suggestions and many subjects in fact can be made to exhib t the other hypnotic phenomena without the preliminary induction of this one

The theory of suggestion may be sa d to be quite triumphant at the present day o er the ne r sis-theory as held at the Salpetr ere with its three states and

worthy of the name of hypnotic trance no peculiar state of nervous equil brium

respectively the theories of

1 Animal magnetism of
Neurosis and finally of
3 Suggestion

According to the *animal magnetism theory* there [illegible] ct passage of force from the operator to the [illegible] the former s puppet [illegible] ary hypnotic phenome [illegible] ome persons as an explanation of a few effects excep [illegible] met with

According to the [illegible] a peculiar pathol [illegible] al [illegible] n [illegible] es [illegible] tion is rarely found in typ al [illegible] en *le grand hypnotisme* [illegible] ie disease hystero ep [illegible] a

[illegible] ance to movements communi [illegible] tain permanently the att [illegible] The eyes are staring there is m [illegible] ibly closed [illegible] by apparent [illegible] e muscular relaxation except where the [illegible] are kneaded or the tendons struck by the operator s hand or certain nerve trunks are pressed upon Then the muscles in question or those supplied by the same nerve trunk enter into a more or less [illegible] ction Charcot calls this symptom [illegible] bility [illegible] hing make [illegible] *inambu* suggestions of [illegible] *y*

[illegible] y to rigid [illegible] ui may upon

[illegible] ability [illegible] symptoms supposed by their observers to be independent of mental expectation are described of which I only will mention the more interesting Opening the eyes of a patient in lethargy causes h [illegible] nto catalepsy If one eye only be op [illegible] s

[illegible] the [illegible] als) to the [illegible] the oppo- [illegible] ry sound heard (*echolalia*) is said to be

The suggestion theory may therefore be appro e l as correct pro ided we grant the trance state as its prerequisite The three states of Charcot the trange reflexes of Heidenhain and all the other bodily phenomena which have been called direct consequences of the trance-state itself are not such They are products of suggestion the trance state having no particular outward symptoms of its own but without the trance state there those particular su estions could never have been successfully made[1]

The Symptoms of the Trance

domin ... personal peculiarity any trick accidentally fallen into in the first instance of some one subject may by attracting attention become stereotyped serve as a pattern for imitatio ... figure as the type of a school The first subject trains the operator the o... good faith consp r... extraordinary per... play for all that concerns the operator with whom they are *en rapport* it is h rd to keep them ignorant of anything which he expects Thus it happens that one eas ly verifies on new subjects what one has already seen on old ones or a y desired symptom of wh ch one may ha e heard or read

The s mptoms earl est observed by writers were all thought to be typical

hypnot c trance I may confine myself to those which are intrinsically interest ng or which differ considerably from the normal functions of man

First of all comes *am esia* In the earlier stages of hypnotism the patient remembers what has happened but with successive sittings he sinks into a de *per cond tion* wh ch is commonly followed by complete loss of memory He m y have been led th ough the liveliest hallucinations and dramatic perform

t o f parts of it by meet ng persons or objects which f gured therein so on be ng ad o tly prompted the hypnot c patient will often remember what happened in his trance One cause of the forgetfulness seems to be the disc nnec t on of the trance performances with the system of aking ideas Memory re-

Th w d gg ti h b en b di d bo t t m h as f t pla ed all my t ri Wh th bj t b y t is by easo f th perat s ggest when h p f t ry t is in q ce f an to g ti h b h has m d t h mself te te. Wh t plain ev ry thing pl ms thing d t m t be memb d th t h t d xpl ti h is th f t th t rtain d t f th bj ct gg t perat as they d t th t m th t th gh th m f ti ns ffect d whi h d tily I d th t f th w king will and that usually all this h ppens in dt f wh ch ft m m ry remains

hypotaxy dissociat ... hich the
y times
... by the
... results but that when it is once
... there are no limits to suggestion s power The state in question has many affinities with ordinary sleep It is probable in fact that we all pass through it transiently whenever we fall asleep and one might most naturally describe the usual relation of operator and subject by saying that the former keeps the latter suspended between waking and sleeping by talking to him enough to keep his slumber from growing profound and yet not in such a way as to wake him up A hypnotized patient *left to himself* will either fall sound asleep or wake up entirely The difficulty in hypnotizing ... that of catching them at th...

... uous with our ordinary beliefs ... ought The latter either vanish altogether or withdraw as it were inertly into the background of the mind and let the incongruous images reign alone These images acquire moreover an exceptional vivacity they become first hypnagogic hallucinations and then as the sleep grows deeper dreams Now the mono ideism or else the impot... y on the part of th... e
...

... might possibly act as its reduc... t... which characterize the hypnotic consciousness must ... a special cerebral change Th... s

... y of the hypnotic images (as ... by their motor effects) the oblivion of them when normal life is resumed the abrupt awakening the recollection of them again in subsequent trances the anæsthesia and hyperæsthesia which are so frequent all point away from our simple waking credulity and suggestibility as the type by which the phenomena are to be interpreted and make us look rather towards sleep and dreaming or towards those deeper alterations of the personality known as automatism double consciousness or second personality for the true analogues of the hypnotic trance Even the best hypnotic subjects pass through life without any one suspecting them to possess such a remarkable susceptibility until by deliberate experiment it is made manifest The operator fixes their eyes or their attention a short time to develop the propitious phase holds them in it by his talk and *the state being there* makes them the puppets of all his suggestions But no ordinary suggestions of waking life ever took ...

... scence may be quite clearly con...
... er state of tra ce of ll th t is going n

notic condition. You can make the subject think that he is freezing or burning, itching or covered with dirt or wet; you can make him eat a potato for a peach or drink a cup of vinegar for a glass of champagne; ammonia will smell to him like cologne water, a chair will be a lion, a broom-stick a beautiful woman, a noise in the street will be an orchestral music, etc. etc., with no limit except your powers of invention and the patience of the lookers-on.[1] Illusions and hallucinations form the *pièces de resistance* at public exhibitions. The comic effect is at its climax when it is successfully suggested to the subject that his personality is changed into that of a baby, of a street boy, of a young lady dressing for a party, of a stump orator, or of Napoleon the Great. He may even be transformed into a beast, or an inanimate thing like a chair or a carpet, and in every case will act out all the details of the part with a sincerity and intensity seldom seen at the theatre. The excellence of the performance is in these cases the best reply to the suspicion that the subject may be shamming—so skilful a shammer must long since have found his true function in life upon the stage. Hallucinations and histrionic delusions generally go with a certain depth of the trance, and are followed by complete forgetfulness. The subject awakens from them at the command of the operator with a sudden start of surprise, and may seem for a while a little dazed.

Subjects in this condition will receive and execute *suggestions of crime*, and act out a theft, forgery, arson, or murder. A girl will believe that she is married to her hypnotizer, etc. It is unfair, however, to say that in these cases the subject is a pure puppet with no spontaneity. His spontaneity is certainly not in abeyance so far as things go which are harmoniously associated with the suggestion given him. He takes the text from his operator; but he may amplify and develop it enormously as he acts it out. His spontaneity is lost only *for* those systems of ideas which *conflict* with the suggested delusion. The latter is thus systematized; the rest of consciousness is shut off, excluded, dissociated *from it*. In extreme cases the rest of the mind would seem to be actually abolished and the hypnotic *subject to be literally* a changed personality, a being in one of those 'second' states which we studied in Chapter x. But the reign of the delusion is often not as absolute as this. If the thing suggested be too intimately repugnant, the subject may strenuously resist and get nervously excited in consequence, even to the point of having an hysterical attack. The conflicting ideas slumber in the background and merely permit those in the foreground to have their way until a *real* emergency arises; then *they* assert their rights. As M. Delbœuf says, the subject surrenders himself good-naturedly to the performance, stabs with the pasteboard dagger you give him because he knows what it is, and fires off the pistol because he knows it has no ball; but for a real murder he would not be your man. It is undoubtedly true that subjects are often well aware that they are acting a part. They know that what they do

[1] A complet fit f drunkenness may be the nseq ence f th ggested champagne. It is even said that eal drunkenness has been ed by uggestio

The uggested hallucinatio ma be f l ed by egative after image, just as if it were real bject. This can be ery easily erined h th suggested hall cinatio f col ed cross sheet f whit pape The subject, on turnin t an ther sheet f pape will see cross of the complementary col Hallucinations ha been sh wn by MM. Binet and Fer to be doubled by prism mirro magnified by lens, and in many ther w y t beha ptically like real bjects. These points ha e been discussed already n p. 536 ff.

quires a continuous oning in this way ance (washing the] y men remembered the trance The act in ques t used over the two states But one can oft n make them remember by merely telling them du ll remember Acts of one neously or at command ie two trances be not mu

Suggestibility The patient believes everything which his hypnotizer tells him and does everything which the latter commands Even results over which the will has normally no control such as sneezing secretion reddening and growing pale alterations of temperature and iation action of the bowels etc m s firm asser me part of the almost phenomena yet to be e effects of th ll say no more under y in detail

ces seem to be those most easily got and the ordinary *routine of hypnotizing consists in provoking them first Tell the pa* tient that he cannot open his eyes or his mouth cannot unclasp his hands or lower his raised arm cannot rise from his seat or pick up n the floor and he will be immed e regards onizing n *paralysis* of an arm for ex ample in will hang *perfectly placid by the subject s side Catalep* tic and tetanic rigidity are easily produced by suggestion aided by handling the parts One of the favorite shows at public exh at of a subject stretched stiff as a bo els on another ntary assump voluntarily *held out straight will drop from* fa gue after a quarter of an hour at the utmost and before it falls the agent s distress will be made manifest by oscillations in the arm disturbances in the breathing etc But Charcot has shown that an arm held out in hypnotic cata lepsy though it may as soon descend yet does so slowly and with no accom panying vibration whilst the breathing remains *entirely* calm *He rightly* points out that *this shows a profound physiological* change and *is proof posi* tive against simulation as far as this symptom is concerned A cataleptic atti tude moreover may be held for many hours —Sometimes an expressive atti tude clinching of the fist contraction of the brows will a sympathetic action of the

be due to th estion of the by the first lity to utter

the concomitants of the hyp-

and amnesias is a very curious one The anæsthesia is not a genuine sensorial one for if you make a real red cross (say) on a sheet of white paper invisible to an hypnotic subject and yet ca [illegible] look fixedly at a dot on the paper on or near the cross he will on tr [illegible]
green after image of the cross
He has *felt* it but not p [illegible]
nize it as it were Anot [illegible]
in order thus to ignore [illegible]
subject it is not there [illegible]
Next he not looking [illegible]
like it, and ask him what he sees He will point out one by one all the new [illegible] every time no matter how numerous the [illegible] the [illegible] teen degrees placed before *one of his eyes* (both being kept open) he will say that he now sees *one* stroke and point in the direction in which the image seen through the prism lies

Obviously then he is not blind to the *kind* of stroke in the least He is blind only to one individual stroke of that kind in a particular position on the board or paper —that is to a particular complex object and, *paradoxical as it may seem* to say so he must distinguish it with great accuracy from others like it in order to remain blind to it when the others are brought near He apperceives it as a preliminary to not seeing at at all! How to conceive of this state of mind is not easy It would be much simpler to understand the process if adding new strokes made the first one visible There would then be two different objects apperceived as totals —paper with one stroke paper with two strokes and blind to the former he would see all that was *in* the latter because he would have apperceived it as a different total in the first instance.

A process of this sort occurs sometimes (not always) when the new strokes instead of being mere repetitions of the original one are lines which combine with it into a total object say a human face. The subject of the trance then may regain his sight of the line to which he had previously been blind by seeing it as part of the face

When by a prism before one eye a previously invisible line has been made visible to that eye and the other eye is closed or screened *its* closure makes no difference the line still remains visible But if *then* the prism is removed the line will disappear even to the eye which a moment ago saw it and both eyes will revert to their original blind state

We have then to deal in these cases neither with a sensorial anæsthesia nor with a mere failure to notice but with something much more complex namely an active counting out and positive exclusion of certain objects It is as when one cuts an acquaintance ignores a claim or refuses to be influenced by a consideration of whose existence one remains aware Thus a lover of Nature in America finds himself able to overlook and ignore entirely the board and rail fences and general roadside raggedness and revel in the beauty and picturesqueness of the other elements of the landscape whilst to a newly arrived European the fences are so aggressively present as to spoil enjoyment

Messrs Gurney Janet and Binet have shown that the ignored elements are

is absurd They know that the hallucination which they see describe and act upon is not really there They may laugh at themselves and they always recognize the abnormality of their state when asked about it and call it sleep One often notices a sort of mocking smile upon them as if they were playing a comedy and they may even say on coming to that they were shamming all the while These facts have misled ultra skeptical people so far as to make them doubt the genuineness of any hypnotic phenomena at all But save the consciousness of sleep they do not occur in the deeper conditions and when they do occur they are only a natural consequence of the fact that the mono ideism is incomplete The background thoughts still exist and have the power of *comment* on the suggestions but no power to inhibit their motor and associative effects A similar condition is frequent enough in the waking state when an impulse carries us away and our will looks on wonderingly like an impotent spectator These shammers continue to sham in just the same way every new time you hypnotize them until at last they are forced to admit that if shamming there be it is something very different from the free voluntary shamming of waking hours

Real sensations may be abolished as well as false ones suggested Legs and breasts may be amputated children born teeth extracted in short the most painful experiences undergone with no other anæsthetic than the hypnotizer s assurance that no pain shall be felt Similarly morbid pains may be annihilated neuralgias toothaches rheumatisms cured The sensation of hunger has thus been abolished so that a patient took no nourishment for fourteen days The most interesting of these suggested anæsthesias are those limited to certain objects of perception Thus a subject may be made blind to a certain person and to him alone or deaf to certain words but to no others [1] In this case the anæsthesia (or *negative hallucination* as it has been called) is apt to become *systematized* Other things related to the person to whom one has been made blind may also be shut out of consciousness What he says is not heard his contact is not felt objects which he takes from his pocket are not seen etc Objects which he screens are seen as if he were transparent Facts about him are forgotten his name is not recognized when pronounced Of course there is great variety in the completeness of this systematic extension of the suggested anæsthesia but one may say that some tendency to it always exists When one of the subjects own limbs is made anæsthetic for example memories as well as sensations of its movements often seem to depart An interesting degree of the phenomenon is found in the case related by M Binet of a subject to whom it was suggested that a certain M C was invisible She still saw M C but saw him as a stranger having lost the memory of his name and his existence —Nothing is easier than to make subjects forget their own name and condition in life It is one of the suggestions which most promptly succeed even with quite fresh ones A systematized amnesia of certain periods of one s life may also be suggested the subject placed for instance where he was a decade ago with the intervening years obliterated from his mind

The mental condition which accompanies these systematized anæsthesias

[1] M Liégeois explains the common exhibition trick of making the subject unable to get his arms into his coat sleeves again after he has taken his coat off by an anæsthesia to the necessary parts of the coat

and amnesias is a very curious one The anæsthesia is not a genuine sensorial one for if you make a real red cross (say) on a sheet of white paper invisible to an hypnotic subject and yet cause him to look fixedly at a dot on the paper on or near the cross he will on transferring his eye to a blank sheet see a bluish green *after image* of the cross This proves that it has impressed his sensibility He has *felt* it but not *perceived* it. He had actively ignored it refused to recognize it as it were Another experiment proves that he must *distinguish* it first in order thus to ignore it Make a stroke on paper or blackboard and tell the subject it is not there and he will see nothing but the clean paper or board Next he not looking surround the original stroke with other strokes exactly like it and ask him what he sees. He will point out one by one all the new strokes and omit the original one every time no matter how numerous the new strokes may be or in what order they are arranged Similarly if the original single stroke to which he is blind be *doubled by a prism of sixteen* degrees placed before one of his eyes (both being kept open) he will say that he now sees *one* stroke and point in the direction in which the image seen through the prism lies

Obviously then he is not blind to the *kind* of stroke in the least He is blind only to one individual stroke of that kind in a particular position on the board or paper —that is to a particular complex object and, paradoxical as it may seem to say so he must distinguish it with great accuracy from others like it in order to remain blind to it when the others are brought near He apperceives it as a preliminary to not seeing at at all! How to conceive of this state of mind is not easy It would be much simpler to understand the process if adding new strokes made the first one visible There would then be two different objects apperceived as totals —paper with one stroke paper with two strokes and blind to the former he would see all that was *in* the latter because he would have apperceived it as a different total in the first instance

A process of this sort occurs sometimes (not always) when the new strokes instead of being mere repetitions of the original one are lines which combine with it into a total object say a human face. The subject of the trance then may regain his sight of the line to which he had previously been blind by seeing it as part of the face.

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preserved in a split off portion of the subjects consciousness which can be tapped in certain ways and made to give an acco (see p 136)

Hyperæsthesia of t æsthesia On the ance The sense oubœuf informs me) a subject after simply on her finger tips a blank card drawn from similar ones can pick it out from the ch here the line ordinary senses, in explanation I have seen a coin from the operator s pocket repeatedly picked out by the subject from a heap of twenty others [1] by its greater weight in the subject s æsthesia may enable

med to be reading was really proved e page reflected on the latter s cornea The same subject was able to discriminate with the naked eye c preparation Such cases of t

ather to h

sing the latter with a lot of The subject will always find sheet again and

r manner th etc other proof of h cious than pes of this are fo d *rapport* This r

the latter expressly awakens he most violent appeals from anyone else are for him as if non existent *whilst he obeys the faintest signals on the part of his hypnotizer* If in catalepsy his limbs will retain their attitude only when the operator moves them when others move them they fall down etc A more remarkable fact still is that the patient will often answer anyone whom his operator touches or at whom he even points his finger in however concealed a manner All of which *is rationally explicable by expectation and suggestion if only it be farther ad*mitted that his senses are acutely sharpened for all the operator s movements [3]

[1] Precautions being tak n aga nst d fferences of temperature and other grounds of sug gestion

[2] It hould be said however that the bystander s ab lity to discriminate unmarked cards and sheets f paper from each other is much gr ate than o e would natu ally suppo e

[3] I must repeat howeve that we a e here on the verg of p ssibly u known f ce and modes of communication Hypnotizati n at a distan e w th no g ounds for e pectation on the subject s part that t was to b tri d seems p etty well established in ce t in ery a e

He often shows great anxiety and restlessness if the latter is out of the room A favorite experiment of Mr E. Gurney s was to put the subject s hands through an opaque screen and cause the operator to point at one f n er *That* finger presently grew insensible or rigid. A bystander pointing simultaneously at an other finger ne er made that insensible or rigid. Of course the e ective *rapport* with their operator had been developed in these trained subjects during the hypnotic state but the phenomenon then occurred in some of them during the waki ... ess was absorbed in animated conver satio ... imp ...

ent people differences for which we have no nam e ... bility for them of the nature of which we can form no clear conception but which seems to be developed in certain subjects by the hypnotic trance —The enigmatic reports of the effect of magnets and metals even if they be due as man contend to unintentional suggestion on the operator s part certainly in vol e hyperæsthetic perception for the operator seeks as well as possible to conceal the moment when the magnet is brought nto play and yet the subject not only finds it out that moment in a way d fficult to understand but may de elop effects wh ch (in the first instance certainly) the perator d d not expect to find Unilateral contractures, movements, paralyses hallucinations etc., are made to pass to the other side of the body hallucinations to disappear or to chan e to the complementary color suggested emotions to pass into their opposites etc Many Italian observations agree with the French ones and the upshot is that if *unconscious suggestion lie at the bottom of this matter* the patients show an enormously exalted power of divining what it is they are expected to do This hyperæsthetic percept on is what concerns us now Its *modus* cannot yet be said to be defined.

Cha ges in the nut ition of the tiss es may be produced by suggestion These effects lead into therapeutics—*a subject which I do not propose to treat of here.* But I may say that there seems no reasonable ground for doubting that in certain chosen ubjects the suggestion of a congestion a burn a blister a raised papule or a bleeding from the nose or skin may produce the effect Messrs. Beaunis Berjon Bernheim Bourru Burot Charcot Delbœuf Dumontpallier Focachon Forel Jendrassik Krafft Ebing Liebault Liegeois Lipps, Mabille and others ha e recently vouched for one or other of these effects Messrs. Delbœuf and Lie eois have annulled by suggestion one the effects of a burn the othe of a blister Delbœuf was led to his experiments after seeing a burn on the

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cases. See in ge ral f nf rmatio these matters, th *P oc d g f th S ciety f P y h R arch passim*

H re gain th percepti in q esti mu t tak pla bel w th th esh ld f dinary consci snes. possibly in ne f those split-off sel es sec d tates wh se ... ce w ha e so f en t re gnize

I m telf erified man f th bo ffects f th mag et ... bli df lded bj ct hom I was trying them f th first tim and wh m I beli to ha e neve h ard f th m bef Th m ment. h er an paq scree was dded t th blindf lding th ffects ceased t incid w th th pproximati f th magn t so th t t looks as if is al pe p tio h d been instrumental in prod cing them. Th bject passed f m my bserv ti th t I ev ld lear p th mystery Of rse I ga e him consci usly hint f what I was looking for

preserved in a split off portion of the subjects consciousness which can be tapped in certain ways and made to give [illegible] (see p 136)

Hyperæsthesia of [illegible] esthesia On the [illegible] tance The sense [illegible] informs me) a subject after simply [illegible] her finger tips a blank card drawn from a pack of sim[illegible] n pick it out from the pack again by [illegible] e *where to many* [illegible] however sharper [illegible] *I have seen a coin from the* operator s pock[illegible] *picked out by the subject from a heap of twenty others*[1] *by its greater weight in the subject s language* —*Audito*[illegible] æsthesia may enable a subject to hear [illegible] a distant room —[illegible] is that reported [illegible] eading [illegible] proved [illegible] on the latter s cornea The same [illegible] to discriminate with the naked [illegible] scopic preparation Such case of [illegible] aguet [illegible] bodies [illegible] *rather to belong to psychical re* [illegible] test of visual hyperacute[illegible] ect the hallucination of a [illegible] ng the latter with a lot of [illegible] subject will always find the picture on the original sheet again and recognize infallibly if it has been turn[illegible] although the bystanders h[illegible]

[illegible] etc [illegible] proof of h[illegible] scious [illegible] than [illegible] lled [illegible] ter [illegible] ry [illegible] from the latt[illegible] wakens [illegible] the most viol[illegible] if non [illegible] If in [illegible] *true only when the operator moves* [illegible] *n others move them they fall down etc A more remarkable fact still* is that the patient will often answer anyone whom his operator touches or at whom he even points his finger in however concealed a manner All of which is rationally explicable by expectation and suggestion if only it be farther ad mitted that his senses are acutely sharpened for all the operator s movements[3]

[1] Pr cautions being t k n ga nst d ff r nc s of temperature and other grounds of sug gestion

[2] It should be sa d howev r that the bystander s ability to discriminate unmarked cards and sheets of pape fr m ach th r is much greate than one would naturally suppose

[3] I must repeat howeve that we are here on the verge of possibly unknown f ce nd modes of c mmun cation Hypn tiz t n t a dist nce w th no grou ds for e pectati n on the subject s part that it n to be t d s ms p tty well stablished in c tain v ry re

o ten improvises as he yields to it some more or less plausible or i enious motive by which to justify t to the lookers-on. He acts in hort with his usual sense of personal spontaneity and freedom and the disbelievers in the freedom of the will have naturally made much of these cases in their attempts to show it to be an illusion.

The only really mysterious feature of these deferred suggestions is the pa tient s abso ute ignorance during the interval preceding their execution that they have been deposited in his mind. They will often surge up at the preappointed time even though you have vainly tried a while before to make him recall the circumstances of their production. The most important class of post h pnotic suggestions are of course those relative to the patient s health—bow els sleep and other bodily functions. Among the most *interest g* (apart from the hallucinat ons) are those relative to future trances One can determine the hour and minute or the signal at which the patient will of his own accord lapse into trance a ain. One can make him uscept ble in future to another operator who may ha e been unsuccessful with him in the past Or more important still in certain cases one can, by suggesting that certain persons shall never be able hereafter to put him to sleep remove him for all future time from hypnotic in fl ences which mi ht be dangerous. This indeed is the simple and natural safe guard against those dangers of hypnotism of which uninstructed persons talk so vaguely A subject who knows *himself to be ultra susceptible should never* allow himself to be entranced by an operator in whose moral delicacy he lacks complete confidence and he can use a trusted operator s suggest ons to protect *himself* against liberties which others knowin his weakness might be tempted to take with him.

The mechanism by which the command is retai ed until the moment for its execution arrives is a mystery which has gi en rise to much discussion. The ex periments of Gurney and the observations of M Pierre Janet and others on cer tain hysterical somnambulists seem to prove that it is stored up in consciousness not simply organically registered but that *the consc o s ess k ch that et ns it is split off d ssociated f om the rest of the subject s m nd* We have here in short an experimental prod ction of one of those second states of the personality of which we have spoken so often Only here the second tate co-exists as well as alternates with the first Gurney had the brilliant dea of *t p ing* this second consciousness by means of the planchette He found that certain persons wh we e both hypnotic ubjects and automatic writers would if their hands we e placed on a planchette (after being wakened from a trance in

alone was continuin to think of the order and possibly of t alone These rese rches ha e opened a new vista of possible experimental investigations into the so-called second states of the personality

Som subjects seem almost as obedient to suggestion in the waking state as in leep o even mo e so according to certain observers Not only muscular phenomena but chan es of personality and hallucinations are recorded as the result f imple affirmation on the operator s part without the previous ceremony of magnetizin or puttin into the mesme ic sleep These are all

skin produced by suggestion at the Salpetriere *by reasoning that if the idea of a pain could produce inflammation it must be because pain was itself an inflammatory irritant* and that the abolition of it from a real burn ought therefore to entail the absence of inflammation He applied the actual cautery (as well as vesicants) to symmetrical places on the skin affirming that no pain should be felt on one of the sides The result was a dry scorch on that side with (as he assures me) no after mark but on the other side a regular blister with suppuration and a subsequent scar This explains the innocuity of certain assaults made on subjects during trance To test simulation recourse is often had to sticking pins under their finger nails or through their tongue to inhalations of strong ammonia and the like These irritations when not felt by the subject seem to leave no after consequences One is reminded of the reported non inflammatory character of the wounds made on themselves by dervishes in their pious orgies On the other hand the reddenings and bleedings of the skin along certain lines suggested by tracing lines or pressing objects thereupon put the accounts handed down to us of the stigmata of the cross appearing on the hands feet sides and forehead of certain Catholic mystics in a new light As so often happens a fact is denied until a welcome interpretation comes with it Then it is admitted readily enough and evidence judged quite insufficient to back a claim so long as the Church had an interest in making it proves to be quite sufficient for modern scientific enlightenment the moment it appears that a *reputed saint can thereby be classed as a case of hystero epilepsy*

There remain two other topics viz post hypnotic effects of suggestion and effects of suggestion in the waking state

Post hypnotic or deferred suggestions are such as are given to the patients during trance to take effect after waking They succeed with a certain number of patients even when the execution is named for a remote period—months or even a year as in one case reported by M Liegeois In this way one can make the patient feel a pain or be paralyzed or be hungry or thirsty or have an hallucination positive or negative or perform some fantastic action after emerging from his trance The effect in question may be ordered to take place not immediately but after an interval of time has elapsed and the interval may be *left to the subject to measure or may be marked by* a certain signal The moment the signal occurs or the time is run out the subject who until then seems in a perfectly normal waking condition will experience the suggested effect In

it and so forth and by the further fact that he is suggestible during its performance that is will receive new hallucinations etc at command A moment later and this suggestibility has disappeared It cannot be said however that relapse into the trance is an absolutely necessary condition for the post hypnotic carrying out of commands for the subject may be neither suggestible nor amnesic and may struggle with all the strength of his will against the absurdity of this impulse which he feels rising in him he knows not why In these cases as in most cases he forgets the circumstance of the impulse having been suggested to him in a previous trance regards it as arising within himself and

Chapter XXVIII

NECESSARY TRUTHS AND THE EFFECTS OF EXPERIENCE

In this final chapter I shall treat of what has sometimes been called *psychogenesis* and try to ascertain just how far the connections of things in the out ward en ironment can account for our tendency to think of and to react upon certain things in certain ways and in no others even though personally we have had of the things in question no experience or almost no experience at all It is a familiar truth that some propositions are *necessary* We *must* attach the predicate equal to the subject opposite sides of a parallelogram if we think those terms together at all whereas we need not in any such way attach the predicate rainy for example to the subject to-morrow The dubious sort of coupl ng of terms is universally admitted to be due to experience the cer

[illegible]

it is supposed to be also due to experience only not to the experience of the

[illegible]

of our connate mental structure and like the necessary judgments are inter preted by the apriorists and the empiricists in the same warring ways.

I shall try in the course of the chapter to make plain three things

1 That taking the word experience as it is universally understood the ex perience of the race can no more account for our necessary or *a priori* judg ments than the exper ence of the individual can

2 That there is no good evidence for the bel ef that our instinctive reactions are fru ts of our ancestors education in the midst of the same environment transmitted to us at b rth

3 That the features of our organic mental structure cannot be explained at all by our conscious intercourse with the outer environment but must rather be understood as *congenital variat ons accidental in the first instance* but then transmitted as fixed features of the race

On the whole then the account which the apriorists give of the *facts* is that which I defend although I should contend (as will hereafter appear) for a nat uralistic view of their *ca se*

The first thing I have to say is that all schools (however they otherwise differ) must allow that the *elementary qual ties* of cold heat pleasure pain red blue sound silence etc are original innate or *a priori* properties of our subjective nature even though they should requ re the touch of experience to waken

Accid tal in th Darwinia sens as bel ging t cycl f causati ina ssibl to th present rder f esearch.

trained subjects however so far as I know and the affirmation must apparently be accompanied by the patient concentrating his attention and gazing however briefly into the eyes of the operator It is probable therefore that an extremely rapidly induced condition of trance is a prerequisite for success in these experiments

I have now made mention of all the more important phenomena of the hypnotic trance Of their therapeutic or forensic bearings this is not the proper place to speak The recent literature of the subject is quite voluminous but much of it consists in repetition The best compendious work on the subject is *Der Hypnotismus* by Dr A Moll (Berlin 1889 and just translated into English N Y, 1890) which is extraordinarily complete and judicious The other writings most recommendable are subjoined in the note[1] Most of them contain a historical sketch and much bibliography A complete bibliography has been published by M Dessoir (Berlin 1888)

[1] Binet and Féré *Animal Magnetism* in the International Scientific Series A Bernheim *Suggestive Therapeutics* (N Y 1889) J Liégeois *De la Suggestion* (1889) E Gurney two articles in *Mind* vol IX —In the recent revival of interest in the history of this subject it seems a pity that the admirably critical and scientific work of Dr John Kearsley Mitchell of Philadelphia should remain relatively so unknown It is quite worthy to rank with Braid s investigations See *Five Essays* by the above author edited by S Weir Mitchell (Philadelphia 1859) pp 141–274

with so real and definite a use ought to be kept sacred and encumbered with no vaguer meaning

If *all* the connections among ideas in the mind could be interpreted as so many combinations of sense-data wrought into fixity in this way from without then experience in the common and legitimate sense of the word would be the sole fashioner of the mind

The empirical school in psychology has in the main contended that they can be so interpreted Before our generation it was the experience of the individual only which was meant. But when one nowadays says that the human mind owes its present shape to experience he means the experience of ancestors as well Mr Spencer s statement of this is the earliest emphatic one and deserves quotation in full

> The supposition that the inner cohesions are adjusted to the outer persistences by *accumulated* experience of those outer persistences is in harmony with all our actual knowledge of mental phenomena. Though in so far as reflex actions and instincts are concerned, the experience hypothesis seems insufficient yet its seeming insufficiency occurs only where the evidence is beyond our reach. Nay even here such few facts as we can get point to the conclusion that automatic psychical connections result from the registration of *experiences continued for numberless generations*
>
> In brief the case stands thus It is agreed that all psychical relations save the absolutely indissoluble, are determined by experiences. Their various strengths are admitted, other things equal to be proportionate to the *multiplication of experiences.* It is an unavoidable corollary that an *infinity of experiences* will produce a psychical relation that is indissoluble. Though such infinity of experiences cannot be received by a single individual yet it may be received by the succession of individuals forming a race And if there is a transmission of induced tendencies in the nervous system it is inferrible that *all psychical relations whatever* from the necessary to the fortuitous result from the experiences of the corresponding external relations and are so brought into harmony with them
>
> Thus the experience-hypothesis furnishes an adequate solution. The genesis of instinct the development of memory and reason out of it and the consolidation of rational actions and inferences into instinctive ones are alike explicable on the *single principle* that the cohesion between psychical states is proportionate to the *frequency* with which the relation between the answering external phenomena has been *repeated in experience*
>
> *The universal law* that other things equal the cohesion of psychical states is proportionate to the *frequency* with which they have followed one another in experience, supplies an explanation of the so-called forms of thought as soon as it is supplemented by the law that *habitual* psychical successions entail some hereditary tendency to such successions which under persistent conditions will become cumulative in generation after generation. We saw that the establishment of those compound reflex actions called instincts is comprehensible on the principle that inner relations are, by *perpetual repetition* organized into correspondence with outer relations. We have now to observe that the establishment of those consolidated those indissoluble those instinctive mental relations constituting our ideas of Space and Time is comprehensible on the same principle. For if even to external relations that are *often* experienced during the life of a single organism answering internal relations are established

The passage is from § [illegible]7 of the *Principles of Psychology* at the end of the chapter entitled Reason. I italicize certain words in order to show that the sense of this explanation is to demand *mentally frequent experience*. The bearing of this remark will later appear (Cf p 867 ff)

them into actual consciousness and should slumber to all eternity without it

This is so on either of the two hypotheses we may make concerning the relation of the feelings to the realities at whose touch they become alive For in the first place if a feeling do *not* mirror the reality which wakens it and to which we say it corresponds if it mirror no reality whatever outside of the mind it of course is a purely mental product By its very definition it can be nothing else But in the second place even if it *do* mirror the reality exactly still it *is* not that reality itself it is a duplication of it the result of a mental reaction And that the mind should have the power of reacting in just that duplicate way can only be stated as a *harmony* between its nature and the nature of the truth outside of it a harmony whereby it follows that the qualities of both parties match

The originality of these *elements* is not then a question for dispute *The warfare of philosophers is exclusively relative to their* FORMS OF COMBINATION The empiricist maintains that these forms can only follow the order of combination in which the elements were originally awakened by the impressions of the external world the apriorists insist on the contrary that *some* modes of combination at any rate follow from the natures of the elements themselves and that no amount of experience can modify this result

What Is Meant by Experience?

The phrase organic mental structure names the matter in dispute Has the mind such a structure or not? Are its contents *arranged* from the start or is the arrangement they may possess simply due to the shuffling of them by experience in an absolutely plastic bed? Now the first thing to make sure of is that when we talk of experience we attach a definite meaning to the word *Experience means experience of something foreign supposed to impress us* whether spontaneously or in consequence of our own exertions and acts Impressions as we well know affect certain orders of sequence and coexistence and the mind s habits copy the habits of the impressions so that our images of things assume a time and space arrangement which resembles the time and space-arrangements outside To uniform outer coexistences and sequences correspond constant conjunctions of ideas to fortuitous coexistences and sequences casual conjunctions of ideas We are sure that fire will burn and water wet us less sure that thunder will come after lightning not at all sure whether a strange dog will bark at us or let us go by In these ways experience moulds us every hour and makes of our minds a mirror of the time- and space-connections between the things in the world The principle of habit within us so *fixes* the copy at last that we find it difficult even to imagine how the outward order could possibly be different from what it is and we continually divine from the present what the future is to be These habits of transition from one thought to another are features of mental structure which were lacking in us at birth we can see their growth under experience s moulding finger and we can see how often experience undoes her own work and for an earlier order substitutes a new one *The order of experience* in this matter of the time and space conjunctions of things is thus an indisputably *vera causa* of our forms of thought It is our educator our sovereign helper and friend and its name standing for something

sisting among the nerves of the infant s brain not only make pos sible certain com binations of imp essions but also imply that such combinations will hereafter be made—imply that there are answering combinations in the outer v o ld—imply a preparedness to c gnize these combinat ons—imply facult es of comprehending th m. It is true that the resulting compound psychical changes do not take place with the same readiness and u 1 r ti n instanced it is true that some indi id s partly due to the fac in their modes f occ pletely cohe e t and greater degree due to and d es n t ceas it

Those who contend 1 wh ch acc mpa es u e — d c

gr du lly n reas g tell gence di pl y ttributable to th mplet on of the experiences—a truth pro ed by the fa play d h gh endowme t of some faculty which our ig into play Do btless experiences ecei ed by the indi dual furnish the co crete m terials fo all thought Doubtless the o ganized and semi orga ized rra gements exist g am ng t r a m no knowledge until there has been a p ese tati n child daily ot connections th the d el pm t th t its int lligenc s wholly *pr duced* by ts experiences That is an utterly inadm s- ble doctrine—a do t ine which makes the p se ce of a b a n meani *gless*—a doc trine whi h m kes diocy un cou table

In the then that th re exist the nervous system ertain p e-established elati ns answering to relations n the environment there is truth in the doctrine of f rm of intuit n —not the t th which its defenders s ppo e but a pa allel truth C rr po ding t bsolute external latio s the e are establ hed i the

fundam tal r lat o s wh h thus p edet rmi ed but al hosts of th r relatio s of mo r less stant kind which a e con enitally rep esented by mo e or le s c mplete nerv s onnections But the e p edeterm ed tern l relat ons th gh independent of the experiences f the indi dual e ot independe t of experiences in gen ral th y ha been determined by th *experiences of p eceding organisms.* The co ll ry here drawn fr m the gene al argument s that the hum n b ai a organ

experien es ha been ces ri ly beq eath d princ pal d interest d have sl wly m unted t that high int lig e which l es latent n th b ai of the infant —which the infant in fter-life exercises and pe hap t gthens o f rther compli cates—and which, with minute dditions t bequeaths to future gen rations And

that become next to automatic—if such a combination of psychical changes as that which guides a savage in hitting a bird with an arrow becomes by constant repetition so organized as to be performed almo … of the processes of adjustment gone th … nsmissible that par … which are nothing … onnections then if there exist … ex … y all org … king … which … be … y uni … ation of sub- … e not in each … e sive races of creatures and such sub- … ve therefore become more consolidated than all others Being experienced in every perception and every action of each c … ons among outer existences must fo … ons among … all … he … ed … ements of thought—the ele- … mpossible to get rid of—the forms of intuition

Such it seems to me is the only possible reconciliation between the e … hypothesis and the hypothesis of the transcend … e by itself Insurmo …

… u assertion that antecedent … blank is to ignore th … ce comes the power of organizing ex … f that power … e same race? … receptivity of impressions why is not … able as a man? Should it be said that language makes the difference then why do not the cat and the dog reared in th … e at equal degrees and kinds of … xperience … stem a … is … d … e … ns are dependent on the nerv … ysiologist shows us that each reflex movement implies the agency of certain nerves and ganglia that a development of complicated instincts is accompanied by complication of the nervous centres and their commissural connections that the same creature in different stages as larva and imago for example changes its instincts as its nervous structure changes and that as we advance to creatures of high intelligence a vast increase in the size and in the complexity of the nervous system takes place What is the obvious inference? It is that the ability to co ordinate impressions and to perform the appropriate actions always implies the pre existence of certain nerves arranged in a certain way What is the meaning of the human brain? It is that the many established relations among its parts stand for so many established rel … anges Each of the constant con … wers to some constant connection … race Just as the organized arrangement sub- … ne nostrils and the motor nerves of the respira … ies not only makes possible a sneeze but also in the newly born infant implies sneezings to be hereafter performed so all the organized arrangements sub-

sisting among the nerves of the infant s brain not only make po ble certain com bination h h combinations will hereafter be made—
preparedness
It is true that the resulting
same readiness and a tomat
true that some indi dual ex
is partly due to the fact that
in their modes of ccurren
pletely c herent and hence
great r degree due to th fa
and does n t cease its spon

Those who c ntend that an l n olut on which acc pan es the auto nous
di
d

In th sense, then, that the e exist in the nervous system certain pre-established relations answering to relations in the env ronment there is truth in the doctrine f forms of intuiti —not the truth which ts defenders suppose but a parallel truth. Correspo ding to bsolute external relations the e a e est blished in the truct re of th erv us system absol t internal relations—rel t ns that are poten

fundamental r Lti s which are thus predetermined but also hosts of other relations of a m e or less c nstant kind, which are co em ally represented by more or less mplete erv us connections But these pred t rm ed internal relations th u h independent of th experien es of the di idual are ot independent of experiences in general they ha e been determined by the experien es f preceding organisms. The

organism has been ea b d. The eff cts of th mo t *nif m d f eq ent* of thes experienc ha b en u es ely bequeathed principal and interest and ha e sl wly mounted to th t high intellige ce which l es latent in the b ain f the infant —which the infant in after life exercises and perhaps strengthens r further compli cates—and which, w th minute additions t beq eaths to future gen rations. And

thus it happens that the European inherits from twenty to thirty cubic inches more brain than the Papuan Thus it happens that faculties as of music which scarcely exist in some inferior human races become congenital in superior ones Thus it happens that out of savages unable to count up to the number of their fingers and speaking a language containing only nouns and verbs arise at l ns and Shakespeares

good de. letails are to be ner of r judgments or of enlarging the experience so as to include these cases among its effects

Two Modes of Origin of Brain Structure

If we adopt the fo The o al d ne heart I am en one what I have erelong to say will make t called chapter to many of my readers He denies experience! they will exclaim denies science believes the mind created by miracle is a re l partisan of innate ideas! That is enough! twaddle no more even more ence does not mean every natural as every supernatural cause It means a particul al agency alongside of which other mo y well exist but we oug and bugbears

Nature has many methods of producing the same effect She may make a born draughtsman or singer by tipping in a certain direction at an opportune moment the molecules of some human ovum or she may bring forth a child ungifted and make him spend laborious but successful years at school She may make our ears ring by the sound of a bell or by a dose of quinine make us see yellow by spreading a field of buttercups before our eyes or by mixing a little santonine powder with our food fill us with terror of certain surroundings by making them really dangerous or by a blow which produces a pathological alteration of our brain It is obvious that we need two words to designate these two modes of operating *In the one case the natural agents produce perceptions which take cognizance of the agents themselves in the other case they produce perceptions which take cognizance of something else* What is taught to the mind by the experience in the first case is the *order of the experience itself*—the inner relation (in Spencer s phrase) corresponds to the outer relation which produced it by remembering and knowing the latter But in the

case of the *other* sort of natural agency what is taught to the mind has nothing to do with the a ency itself but with some different outer relation altogether A diagram will express the alternatives *B* stands for our human brain in the midst of the world All the l ttle *o* s with arrows proceedin from them are natural objects (like sunsets etc.) which impress it through the senses and in the trict sense of the word give it *experience* teaching it by habit and association what is the order of their ways All the l ttle *x's* inside the brain and all the l ttle *x s* outside of it are other natural objects and processes (in the ovum in the blood etc) which equally modify the brain but mould it to no co nition of *them*

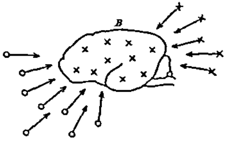


FIG. 94

han together in the mind cop es and teaches the sequences of sunsets and rain fall in the outer world

In zoological evolution we have two modes in which an animal race may grow to be a better match for its environment.

F rst the so-called way of adaptat on in which the environment may itself

certain youn are born w th peculiar ties that help them and their pro ny to survive That variations of *this* sort tend to become hereditary no one doubts

The first mode is called by Mr Spencer direct the second indi ect, equilibration B th equilibrati ns must of course be natural and phys cal processes but they belon to entirely different physical pheres The direct influences are ob ious a d accessible things The causes of variation in the young are on the th r hand m lecular and hidden The d rect influences are the animal s ex periences in the widest sense of the term Where what is influenced by them is the *mental* o ganism they are *conscious* experiences and become the *objects* as well as the causes of their effects That is the effect consists in a tendency of the experience itself to be remembered or to ha e its elements thereafter co pled in imaginati n just as they *were coupled in the experience* In the diagram these experiences are represented by the *o* s exclusively The *x s* on the other hand stand f the indirect causes of mental modification—causes of which we are not immediately conscious as such and which are not the direct *objects* of the effects they produce Some of them are molecular accidents before

birth some of them led om m

... er brother not Just so with ... sickness which so far from being engendered by long experience of its object (if a heaving deck can be called its object) is erelong annulled thereby Our higher æsthetic moral and intellectual life seems made up of affections of this collateral and incidental sort which have entered the mind by the back stairs as it were or rather have not entered the mind at all but got surreptitiously born in the house No one can successfully treat of psychogenesis or the factors of mental evolution without distinguishing between these two ways in which the mind is assailed The way of experience proper is the front door the door of the five senses The ... affect the brain in this way immediately [1] agents do not It ... effective skill in ... genius the other a mere obstinate plodder ... e studio that both alike owe their skill to their experience The reasons of their several skills lie in wholly disparate natural cycles of causation [1]

I will then with the reader s permission *restrict the word experience to processes which influence the mind by the front door way of simple habits and association* What the back door effects may be will probably grow clearer as we proceed so I will pass right on to a scrutiny of the actual mental structure which we find

[1] *Principles of Biology* pt III chaps XI XII —Goltz and Loeb have found that dogs become mild in character when their occipital and fie ce the ... ra n lobes are cut off A dog wh ch o ig nall ... ng h mself to be touch ... ead from my ... ul and harm ... Each one f th m mad him n r ... at last (ju t as Goltz observed of his dogs) ... ogs take away the very b nes wh ch h ... p 300) A ... good ature This however ... n ign re the d stincti n bet ... n tl f ont-door and ... back door mann rs f p ducing mental change

One of the most striking of the back d r affect ns is *sus ptibil ty t th h n of d unk nness* This (taking drunkenness n the br ader t ense as test t le use th ... d) is one of the deep st funct ns of human nature Half of both the po try and the t agedy of human l f would vanish if alcohol were tak n away As it ... the th rst f t is ... ch that in the Un t d States the cash v lue of its sal ... of n eat and of bread put togethe ... tl is pecul ... h c mpara ... m e e t n ... tal t u tu e by l it g nly th se ... whom it is not st o g Th love of d u k nness i a p rely ... d ntal susc ptibility of a b ain ev l ed for nt rely diff rent us s and its cau es a to be sought in the mol cular re lm rathe than in any poss bl o d r f oute r lati ns

The Genesis of the Elementary Mental Categories

We find

1 Elementary sorts of sensation and feelings of personal activity
2 Emotions desires instincts ideas of worth æsthetic ideas
3 Ideas of time and space and number
4 Ideas of difference and resemblance and of their degrees
5 Ideas of causal dependence among events of end and means of subject and attribute
6 Judgments affirming denying doubting supposing any of the above ideas
7 Judgments that the former judgments logically involve exclude or are in

(

outset of every scientific investigation or there is no tim[illegible] the first account of their origin which we are likely to hit upon is a snare All these mental affections are ways of knowing objects Most psychologists nowa days believe that the objects first in some natural way engendered a brain from ut of their midst and then imprinted these various co nitive affections upon it But how? The ordinary evolutionist answer to this question is exceed ingly sin ple-minded The idea of most peculators seems to be that since it suffices *ow* for us to become acquainted with a complex object that it should be simply *p ese t to us often enough so it must be fair to assume universally* that with time enough given the *mere presence* of the various objects and rela tions to be known must end by bringing about the latter s cognition and that in this way all mental structure was from first to last evolved Any ordinary Spencerite will tell you that just as the experience of blue objects wrought into our mind the color blue and hard objects got it to feel hardness so the presence *of large and small objects in the world gave it the notion of size moving objects* made it aware of motion and objective successions taught it time Similarly in a wo ld with d fferent impressing things the mind had to acquire a sense of difference whilst the like parts of the world as they fell upon it kindled in it the perception of similar ty Outward sequences which sometimes held good and sometimes failed naturally engendered in it doubtful and uncertain forms of expectation and ultimately gave rise to the disjunctive forms of judgment whilst the hypothetic form if *a* then *b* was sure to ensue from sequences that were n ariable in the outer world On this view if the outer order sud d nly were to chan e its elements and modes we should have no faculties to cognize the new order by At most we should feel a so t of frustration and con fus on But little by little the new presence would work on us as the old one did and in course of time another set of psychic categories would arise fitted to take co nizance of the altered world

This not on of the outer world inevitably building up a sort of mental dupli cate of tself f we only gi e it time is so easy and natural in its vagueness that one hardly knows how to start to critic se it One thi g however is obv ous nam ly that *the ma ner n which we now become acquainted u th complex ob- jects ced not n the least esemble the manner in which the original elements*

of our consciousness grew up Now it is true a new sort of animal need only be present to me to impress *its image permanently on my mind* b t th cause I am already in posse on s

poss e objects The objects need only a aken these from their slumber But it is a very different matter to account for the categories themselves I think we must admit that the origin of the vari ous elementary feelings is a recondite history even after some sort of neural tissue is there for the outer world to begin its work on The mere ex t things to be known is even now n

r e find that they correspond to some reality What immediately produced them were previous thoughts with which and with the brain processes of which that reality had naught to do

Why may it not have been so of the original elements of consciousness sen sation time space resemblan e d ? Why may they ysical processes ard summation of at of the sensible presence of objects? Why may they not in short be pure *idiosyncrasies* spontaneous variations fitted by good luck (those of them which have survived) to take cognizance of objects (that is to steer us in our *active* dealings with them) without being *in any* intelligible I think we shall find this view gain

All these elements are subjective duplicates of outer objects They *are not* the outer objects The secondary qualities among them are not supposed by any ed ucated person even to resemble the objects Their *nature* depends more on the reacting brain than on the *stimuli* which touch it off This is even more pal lly true of the natures of plea nd

Their *time and space relations* however *are* impressed from without—for two outer things at least the evolutionary psychologist must believe to resemble our thoughts of them these are the time and space in which the objects lie *The*

[1] Mr Grant Allen in a br ll t) seeks n d to ent If b an p cter of Nature Only th en n o m nt *to is lf* But I think w ought t k a ch ges in the b ain a e on which th ught depends, be hat the effe t c n b f th r possible at ns Mr laudable effo t to conce v them dist ctly T me h s na om cal M nwhile th s ssay and an ther by the same author in the *Atla t c M thly* r p ob bly s s ous attempts as a y that have been made towards applying the Spencerian the ry in a radical way to the facts of human history

time and space relations between things do stamp copies of themselves with n Things juxtaposed in space impress us continue to be thought of *as* thus juxta posed Things sequent in time impress their sequence on our memory And thus through experience in the legitimate sense of the word there can be truly explained an immense number of our mental habitudes many of our abstract beliefs and all our ideas of concrete things and of their ways of behavior Such truths as that fire burns and water wets that glass refracts heat melts snow fishes l e in water and die on land and the like form no small part of the most refined education and are the all in a
lowest men Here the mind is passive
unresistingly fashioned from without It is the merit of a
to have seen the wide scope of these effects of neighborhood in time and pace and the r exaggerated applications of the principle of mere neighborhood ought not to blind us to the excellent service it has done to Psychology in their hands As far as a large part of our thinking goes then it can intelligibly be formu lated as a mere lot of *habits* impressed upon us from without The degree of cohes on of our inner relations is in this part of our thinking proportionate in Mr Spencer s phrase to the degree of cohesion of the outer relat ons the causes and the objects of our thought are one and we are in so far forth what the materialistic evolutionists would have us altogether mere offshoots and crea tures of our en ironment and naught besides

But now the plot thickens for the images impressed upon our *memory* by the outer stimuli are not restricted to the mere time- and space-relations in which they originally came but revive in various manners (dependent on the intricacy of the brain paths and the instability of the tissue thereof) and form secondary combinations such as the *forms of judgment* which taken *per se* are not congruent e ther with the forms in which reality exists or in those in wh ch experie ces befall us but which may nevertheless be explained by the

of o e term will then engender a fixed a waverin or a negative expectation of another giving the affirmative hypothetical disjunctive interrogative and

o der in which our perceptions come to us a vague nucleus grov in gradually more detailed as we attend to t more and more These particular secondary mental forms have had ample justice done them by Associationists from Hume downwards

Associationists ha e also sought to account for d scrimination abstraction and generalization by the rates of frequency in which attributes come to us conjoined with much less success I think In the chapter on Discrimination I ha e under the law of dissociation by varyin concomitants sought to ex plain as much as possible by the passive order of experience But the reader saw how much was left for active interest and unknown forces to do In the

In my wn p ev us chapters habit, m m ry associati and percepti n, justi e has been don to all these facts

chapter on Imagination I have similarly striven to do justice to the blended image theory of generalization and abstraction So I need say no more of these matters here

The Genesis of the Natural Sciences

Our scientific ways of thinking of the outer reality are highly abstract ways The essence of things for science is not to be what they seem but to be atoms and molecules moving to and from each other according to strange laws Nowhere does the account of inner relations produced by outer ones in proportion to the frequency with which the latter have been met more egregiously break down than in the case of scientific conceptions *The order of scientific thought* is quite incongruent either with the way in which reality exists or with the way in which it comes before us Scientific thought goes by selection and emphasis exclusively We break the solid plenitude of fact into separate essences conceive generally what only exists particularly and by our classifications leave nothing in its natural neighborhood but separate the contiguous and join what the poles divorce The reality *exists* as a *plenum* All its parts are contemporaneous each is as real as any other and each as essential for making the whole just what it is and nothing else But we can neither experience nor think this *plenum* What we experience what *comes before us* is a chaos of fragmentary impressions interrupting each other [1] what we *think* is an abstract system of hypothetical data and laws [2]

[1] The order of nature as perceived at a first glance presents at every instant a chaos fol lowed by another chaos We must decompose each chaos into s ngle facts We must l arn to see in the chaotic antecedent a multitude of distinct antecedents in the chaotic conse quent a multitude of di tinct consequents This supposing it done w ll not of itself tell us *on which of the antecedents each cons qu nt is invariably attendant To d term ne that* point we must endeavor to effect a separation of the facts from one anoth r not in our minds only but in nature The mental analysis however must take place f rst And every *one knows that n the mode of performing it one intellect d ffers immens ly from another* (J S Mill *Log c* bk iii chap vii § 1)

[2] I quote from an add ess ent tled Reflex Action and Theism publish d in the *U i n Rev w* for November 1881 and translated in the *Crit qu ph losoph que* for January and February 1882 The conceiving or theorizing faculty wo ks exclusiv ly f the sake of ends that do not exist at all in the world of the impressions received by way *f our senses* but are set by our emotional and practical subject vity It is a t ansf me of the wo ld of our impressions into a totally diff rent world the world of our concepti ns and the trans *formation is effected in the nter sts of u v l tional nature* and for no oth purpose what soever Destroy the vol tional natu e the definite subj ctive purpo s p fe nce fondness for certain eff cts forms ders and n t the f ght st motive would rem n f r *the brute* order of our experience to be remod ll d at all But as we have th lab rat v lit nal con stitution we do have th remodelling must be eff cted th e is no escape Th w ld s con tents are *g v n* to each of us *in an order so for gn t ou subj cti e int ests th t* we can hardly by an effort of the imagination picture to ou elv s what it is like W ha e t break that o d altogethe and by p cking out f om t th t m that c nc n us and onn ting *them* with other far away which we s y bel ng w th th m w a e abl t mak out definite threads f sequ nce and t ndency to f esee p t cular l ab litie and g t dy f r them to enj y simpl city and harmony n the place f wh t as cha Is not th um f your actual experi nce tak n at this moment and mpart ally added t g th an utter haos? The strains of my vo ce the l ghts and shades in d the room nd ut th mu mu of the wind the ticking *of the clock* the vari us ganic f el ngs you may h ppen i di du lly to possess do these make a whole at all? Is it not the nly c ndition of your mental sanity

This sort of scientific algebra little as it immediately resembles the reality gi en to us turns out (strangely enough) applicable to it That is it yields ex pressions which at given places and times can be translated into real values o interpreted as definite portions of the chaos that falls upon our sense It be- (is well as a theoretic delight

tific conception is in the first instance a pu — brain For one that proves useful and applicable there are a thousand that perish through their worthlessness Their genesis is strictly akin to that of the flashes of poetry and sallies of wit to which the instable brain paths equally give rise But whereas the poetry and wit (like the cience of the ancients) are their own excuse for being and have to run the gauntlet of no farther test the scientific conceptions must prove their worth by being verified This test however is the cause of their *preservation* not that of the r production and one might as well account for the origin of Artemus Ward s jokes by the cohes on of subjects with predicates in proportion to the persistence of the

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in th midst f th m that m t f th m sh ld b m n existent f y and that f w th s—th ds I h pe, wh ch I m tt ring—sh ld k f m pla es in y m m ry th t h thing t d th this sce associates fitted t mb ne w th th m what w call u al train f th ght?—rati nal bec use t l ds t nclusi w h e some rgan t pp ciat W ha gan f lity t pp eciate th simply m rd The real ld t is gi t this m m t is th m t tal of all ts beings and ts now B t can w thi k f ch m? Can w realiz f tant what a cr ss secti f all exist t d fin t point f tim uld be? Whil I talk and the flies buzz a se gull catches fish t th m th f th Amaz tr f ll th Adir dack w ld rn ss, man T rt rv d twins re born in F e, What d th t

b eak t t rt d b k t int sci es d th w beg t f l t h m We mak te th usand separ t seri l d rs of t On any f these, w may ct as f th est did t t W dis m g ts parts l u ns th t w r gi t nse t ll—math m t l latı t g ts sq ar s, d ts d logarithmi f nctions,—and t f an infinit mbe f thes w call ce t in es ess ti l d la gi ing and ig th est Esse ti l th se l t b t nly *f p p se* th th latı b g just as real and p esent as th y d p rpose l to *er mply* and to *f* A t

poses and ends *Cf* lso Hodg o *Phil phy f R fl t* ch Lotze *Log k* §§ 342-35 S gw rt *L g k* §§ 60-63 p 5

In an rti l entitl d G t Men G t Th ghts and the E vi nm t p blish d in th *Atla tic M thly* f O t b 880 th d will fi d m ampl illustrati ns f these marks I h th t d t sh w that both m tal d ocial l ti ar t be

Spencer and M Allen

outer relations' to which they correspond as to treat the genesis of scientific conceptions in the same ponderously unreal way

The most persistent outer relations which science believes in are never matters of experience at all but have to be disengaged from under experience by a process of elimination that is by ignoring conditions which are always present The *elementary* laws of mechanics physics and chemistry are all of this sort The principle of uniformity in nature is of th [illegible] *ht* under and in spite of th [illegible] of its [illegible] The [illegible] es in our [illegible] the proximate laws of nature and [illegible] of concrete things that heat melts ice that salt preserves meat that fish die out of water and the like[1] Such empirical truths as these we admitted to form an enormous part of human wisdom The scientific truths have to harmonize with these truths or be given up as useless but they arise in the mind in no such passive associative way as that in which the simpler truths

[1] It s perfectly [illegible] ations as lead [illegible] tions lead the [illegible] lieve that the [illegible] him fear the [illegible] whereas a part of these associations grows [illegible] is destroyed by contradictory experiences [illegible] rovinces one in which we are at home and [illegible] nces another filled with alternating vari[illegible] ences

Accident is in a wide sphere such an every day matter that we need not be surprised if it sometimes invades the territory where order is the rule And one personification or another of the capricious power of chance easily helps us over the difficulties which further reflection might find in the exceptions Yes indeed Exception has a peculiar fascination it is a subject of astonishment a [illegible] and the credulity with which in this first stage of pure association we adopt our supposed rules *is matched by the equal credulity with which we adopt the miracles that interfere with them*

The whole history of popular beliefs about nature refutes the notion that the thought of an universal physical order can possibly have arisen through the purely passive reception and association of particular perceptions Indubitable as it is that all men infer from known cases to unknown it is equally certain that *this procedi*[illegible] *nal materials that* [illegible]

[illegible] where [illegible] operty [illegible] on th [illegible] present [illegible] rather [illegible] h lik [illegible] re[illegible] ed the form processes but [illegible] in th[illegible] form his conc[illegible]pts [illegible] e no such application And [illegible] lized throughout the entire phenomenal world those necessities which are the fundamental [illegible] (C Sigwart *Logik* ii pp 380-82)

arise. Even those experiences which are used to prove a scientific truth are for the most part artificial experiences of the laboratory gained after the truth itself has been conjectured. Instead of experiences engendering the inner relations the inner re[illegible] ences here.

What hap[illegible]
pens in eve[illegible]
in every p[illegible]
The fashio[illegible]

processes [illegible]
be exposed to exactly the same outer relations [illegible]
owe their being to causes which correspond far more to the sourings and fermentations of dough, the setting of mortar, or the subsidence of sediments in mixtures, than to the manipulations by which these physical aggregates came to be compounded. Our study of similar association and reasoning taught us that the whole superiority of man depended on the facility with which in his brain the paths worn by the most frequent outer cohesions could be ruptured. The causes of the instability, the reasons why now this point and now that become in him the seat of rupture, we saw to be entirely *obscure* (pp. 3[illegible]9–8[illegible], 689). The only clear thing about the peculiarity seems to be its interstitial character and the certainty that no mere appeal to man's "experience" suffices to explain it.

When we pass from scientific to æsthetic and ethical systems, every one readily admits that although the elements are matters of experience, the peculiar forms of relation into which they are woven are incongruent with the order of passively received experience. The world of æsthetics and ethics is an ideal world, a Utopia, a world which the outer relations persist in contradicting, but which we as stubbornly persist in striving to make actual. Why do we thus invincibly crave to alter the given order of nature? Simply because other relations among things are far more interesting to us and more charming than the mere rates of frequency of their time- and space-conjunctions. These other relations are all secondary and brain born, "spontaneous variations" most of them, of our sensibility, whereby certain elements of experience and certain arrangements in time and space have acquired an agreeableness which otherwise would not have been felt. It is true that habitual arrangements may also become agreeable. But this agreeableness of the merely habitual is felt to be a mere type and counterfeit of real inward fitness; and one sign of intelligence is never to mistake the one for the other.

The[illegible] [illegible] dea[illegible] [illegible] relations amongst the objects of o[illegible] thought

with its order—the early Christian [illegible]
porary anarchist with his abstract dream of justice, will tell you that the existing order must perish root and branch ere the true order can come. Now the peculiarity of those relations among the objects of our thought which are dubbed 'scientific' is this, that although they no more are inward *reproductions* of the

outer order than the eth [1] they do not conflict ... ie inward forces are ... ely the only ones which have survived long e... to be matters of record—to be *congruent* with the time and space-relations which our impressions affect

In other words though nature s materials lend ... mselves slowly and discouragingly to our tran ... but more readily into æs... y lend themselves with rela... ... the translation it is true will probably never be ended The perceptive order does not give way nor the ... substitute for it arise at our bare word c... it and many a man of science can say like ... Es klebt Blut an der Arbeit But victo... ctory makes us sure that the essential doom of our enemy is defeat [2]

[1] Cf Hodgson *Philosophy of Reflection* book II chap v

[2] The aspiration to be scientific is such an idol of the tribe to the present generation is so sucked in with his mother s milk by every one of us that we find it hard to conceive of a creature who should not feel it and harder still to treat it freely as the altogether peculiar and one sided objective interest which it is But as a matter of fact few even of the cultivated members of the race have shared it it was inv... a generation or two ago In the middle ages it meant onl... hich it even now strikes Orient... ... an English ... end of his ... education not to be given in full It

My Illustrious F end and Joy of my Liver!

The thing you a k of me is both difficult and useless Although I have passed all *my* days in this place I have neither counted the houses nor inqu red into the number of the inhabitants and as to what one person loads on his mules and the other stow s away in the bottom of his ship that is no business *of mine* But above all as to the previous history of this city God only knows the amount of dirt and confusion that the infidels may have eaten before the coming of the sword of Islam It w re unprofitable for us to inquire into it

O my soul! O my lamb! seek not after the things which concern thee not Thou camest unto us and we welcomed thee go in peace

Of a truth thou hast poken many words *and there is no harm done for the speaker is* one and *the listener is another After the fashion of thy people thou hast* wandered *from* one place to another until thou art happy and content in n ne We (praise be to God) were born here and never desire to qu t it Is it poss ble then that the idea of a general intercourse between mank nd should make any impression on our understandings? God forbid!

Listen O my son! There is no wisdom equal unto the belief in God! He created the world and shall we liken ourselves unto Him in seeking to pen trate into the mysteri s of *His creation?* Shall we say Behold this star p nneth round that star and this th r st r with a tail goeth and cometh in so many years! Let it go! He from whose hand it came w ll gu de and d rect it

B t th ... I am more learned than th u art ... rt in this respect bette th n I am ... ch I requ e n t Th u art learned ... at which thou hast seen I p t upon t Will much w It th u see P dise with thin ?

The is no G d but God! Do no e il nd thus ... r sur ly thine hour will come!

Th meek in spi t (El Fak)

IMAUM ALI ZADI

The Genesis of the Pure Sciences

I have now stated in general terms the relation of the natural sciences to experience strictly so called and shall complete what I have to say by reverting to the subject on a later page At pr
sciences of Class fication Logic
is that they are even less than the n
world as it comes to our experience THE PURE SCIENCES EXPRESS RESULTS OF COMPARISON *exclusi ely comparison is not a concei able effect of the order in which outer impress ons are experienced—it is one of the house born* (p 858) *portions of our mental structure therefore the pure scie ces form a body of propositions with whose genesis experience has nothing to do*

First consider the nature of comparison *The relations of resemblance and d fference among thi gs have nothing to do with the time and space order in which we may experience the latter* Suppose a hundred beings created by God and gifted with the faculties of memory and comparison Suppose that upon each of them the same lot of sensations are imprinted but in different orders Let some of them have no single sensation more than once Let some have this one and others that one repeated Let every conceivable permutation prevail And then let the magic lantern show d e out and keep the creatures in a void eternity w th naught but their memories to muse upon Inevitably in their long le sure they will beg n to play with the items of their experience and rearrange them make classificatory series of them place gray between white and black orange between red and yellow and trace all other degrees of resemblance and difference And this new construction will be absolutely identical in all the hundred creatures the diversity of the sequence of the original experiences having no effect as regards this rearrangement Any and every form of sequence will give the same result because the result expresses the relation between the *inward natures* of the sensations and to that the question of their outward succession is quite irrelevant Black will differ from white just as much in a world in which they always come close together as in one in which they always come far apart just as much in one in which they appear rarely as in one in which they appear all the time

But the ad ocate of persistent outer relations may still return to the charge These a e what make us so sure that white and black differ he may say for n a wo ld whe e sometimes black resembled white and sometimes differed f om it we could never be so sure It is because in this world black and white have *always* d ffered that the sense of their difference has become a necessary form of thought The pair of colors on the one hand and the sense of difference on the other inseparably exper enced not only by ourselves but by our ancestors have become inseparably connected in the mind Not through any essential structure of the mind which made difference the only possible feeling which

a single experience would suffice to make us feel the necessity of this relation

I know not whether Mr Spencer would subscribe to this or not —nor do I care, for there are mysteries which press more for solution than the meaning of this vague writer s words But to me such an explanation of our difference-judgment is absolutely unintelligible We now find black and white different the explanation says *because we always have so found them* But why should we always have so found them? Why should difference have popped into our heads so invariably with the thought of them? There must have been either a subjective or an objective reason The subjective reason can only be that our minds *were so constructed that a sense of difference* was the only sort of conscious transition possible between black and white the objective reason can only be that difference was always there with these colors outside the mind as an objective fact The subjective reason explains outer frequency by inward structure not inward structure by outer frequency and so surrenders the experience-theory The objective reason simply says that if an outer difference is there the mind must needs know it—which is no explanation at all but a mere appeal to the fact that somehow the mind does know what is there

The only clear thing to do is to give up the sham of a pretended explanation and to fall back on the fact that the sense of difference *has* arisen in some natural manner doubtless but in a manner which we do not understand It was by the back stairs way at all events and from the very first happened to be the only mode of reaction by which consciousness could feel the transition from one term to another of what (in *consequence* of this very reaction) we now call a contrasted pair

In noticing the differences and resemblances of things and their degrees the mind feels its own activity and has given the name of *comparison* thereto It need not compare its materials but if once roused to do so it can compare them with but one result and this a fixed consequence of the nature of the materials themselves Difference and resemblance are thus relations between ideal objects or conceptions as such To learn whether black and white differ I need not consult the world of experience at all the mere ideas suffice *What I mean* by black differs from *what I mean* by white whether such colors exist *extra mentem meam* or not If they ever do so exist they *will* differ White things may blacken but the black of them will differ from the white of them so long as I mean anything definite by these three words [1]

I shall now in what follows call all propositions which express time and space relations empirical propositions and I shall give the name of rational propositions to all propositions which express the results of a comparison The latter denomination is in a sense arbitrary for resemblance and difference are not usually held to be the only rational relations between things I will next proceed to show however how many other rational relations commonly supposed

[1] Though a man in a fever should from sugar have a bitter taste which at another time would produce a sweet one yet the idea of bitter in that man s mind would be as clear and distinct from the idea of sweet as if he had tasted only gall Nor does it make any more confusion between the two ideas of sweet and bitter that the same sort of body produces at one time one and at another time another idea by the taste than it makes a confusion in two ideas of white and sweet or white and round that the same piece of sugar produces them both in the mind at the same time Locke *Essay* bk. ii, ch xi, § 3

distinct can be resolved into these so that my definition of rational propositions will end I trust by proving less arbitrary than it now appears to be

Series of Even Difference and Mediate Comparison

In Chapter XII we saw that the mind can at successive moments *mean the same* and that it gradually comes into possession of a stock of permanent and fixed meanings, ideal objects or conceptions, some of which are universal qualities like the black and white of our example and some, individual things We now see that not only are the objects permanent mental possessions but the results of their comparison are permanent too The objects and their differences together form an immutable system *The same objects compared in the s me way always give the same esults* if the result be not the same then the objects are not those or ginally meant.

This last principle which we may call the *axiom of const t result* holds good throughout all our mental operations not only when we compare but when we add divide class or infer a given matter in any conceivable way Its most general expression would be *the Same operated on n the same way gives the Same* In mathematics it takes the form of equals added to or subtracted from equals give equals, and the like. We shall meet with it again

The next thing which we observe is that *the ope ation of comparing may be e eated on its own esults* in other words that we can think of the various resemblances and differences which we find and compare them with each other making differences and resemblances of a higher order *The m d thus becomes aware of sets of similar differences and forms series of terms with the same kind a d amount of difference between them terms which as they succeed each other mainta n a const nt direction of serial increase* This sense of constant direction in a series of operations we saw in Chapter XIII (p 319) to be a cardinal mental fact. A differs from B differs from C differs from D etc., makes a *series* only when the differences are in the same direction. In any such difference-series all terms differ in just the same way from their predecessors The numbers 1 2 3 4, 5 the notes of the chromatic scale in music are familiar examples. As soon as the mind grasps such a series as a whole it perceives that *two terms taken far apart d ffer more than two terms taken near together* and that any one term differs more from a remote than from a near successor and this no matter what the terms may be or what the sort of difference may be provided it is

rection of diffe nces Such a formula would cover all poss ble cases as earlier than early is earlie than late worse than bad is worse than good east of east is east of west etc., etc., *ad libitum* Symbolically we might write it as $a < b < c < d$ and say that any number of intermediaries may be expunged without obliging us to alter anything in what remains written

The principle of mediate comparison is only one form of a law which holds in many series of homo eneously related terms the law that *sk pp ng termediary*

Cf Bradley *Logic* p 6

terms leaves relations the same This ax ... or of
TRANSFERRED REL ... neu
... im
... *It*
ian s thought
be to find no-difference
ies may be lipped and
the *axiom*
rinciple of
... eness and
... experiences come associated to-
... again $a = b = c = d$ with the same consequence
as regards expunging terms which we saw before

Classificatory Series

Thus we have a rather intricate system ... *al*
truths of compariso ... *f*

... ong themselves The first
... are purely classificatory Where facts fall easily
... rich and intricate series (as plants and animals and chemical compounds
do) the mere sight of the series fills the mind with a satisfaction *sui generis*
and a world whose *real* materials naturally lend themselves to serial classifica
tion is *pro tanto* a more rational world a world with ... el
more intimate than with a wo ... y
naturalists ... p-
posed to be ... *adoration of his*
nce of his
ally clas
... at least

The Logic Series

Closely akin to th ... *ing or*
other
I call
s re-
... rac
... likenesses obtain The groups
... the respects are *characters* or *attributes* The attributes
again may be compared forming genera of higher orders and their characters
singled out so that we have a new sort of series *that of predication or of kind*

including ki d Thus horses are quadrupeds quadrupeds animals animals machines machines liable to wear out etc. In such a series as this the several couplings of terms may have been made out originally at widely different times and under different circumstances But memory may bring them together afterwards and whenever it does so our faculty of apprehending serial increase makes us conscious of them as a single system of successive terms united by the same relation

Now whenever we become thus conscious we may become aware of an additional relation which is of the hi he t intellectual importance inasmuch as upon it the whole structure of l [illegible] is eared *The pr nciple of mediate predication or subsumption* is only the [illegible]
successive predications [1] [illegible]
stands to any later term in the same rela [illegible]
ate term in other words that *whatever has an attribute has all the attributes of that attr bute* or more briefly still that *whatever is of a kind is of that kind s k nd* A little explanation of this statement will bring out all that it involves

We learned in the chapter on Reasoning what our great motive is for abstracting attributes and predicating them It is that our varying practical purposes require us to lay hold of different angles of the reality at different times But for these we should be satisfied to see it whole and always al ke The purpose however makes one aspect essential so to avoid di persion of the attention we treat the real ty as if for the time being it were nothing but that aspect and we let its supernumerary determinations go In short we substitute *the aspect for the whole real thing For our purpose the aspect can be substituted* for the whole and the two treated as the same and the word *is* (which

[illegible]
poses the equation series $a=b$ $b=c$ $c=d$ etc

B t what is our purpose in predicating? Ultimately it may be anything we please but proximately and immediately it is always the gratification of a certain curiosity as to whether the object in hand is or is not *of a kind* connected with that ultimate purpose Usually the connection is not obvious and we only find that the object S is of a kind connected with P after first finding that it is of a kind M which itself is connected with P Thus to fix our ideas by an example we ha e a curios ty (our ultimate purpose being conquest over nature) as to how S rius may move It is not obv ous whether Sirius is a kind of thing wh ch moves in the line of sight or not When however we find it to be a kind of thing in whose pectrum the hydrogen line is shifted and when we reflect that *that* kind of thing is a kind of thing which moves in the line of sight we c nclude that Sirius does so move Whatever Sirius s attribute is Sirius is its adjective s adjective can supersede its own adjective in our thinking and this w th no loss to our knowledge *so lo g as we stick to the definite p pose n view*

Now please note that this elimination of intermediary kinds and transfer of

[1] This pprehensi f th m as f rmin single y t m is wh t Mr Bradl y means by th ct *f const uction* which underlies ll reasoning. Th w reness, which then super es, f th dditional relati f which I peak in the ext paragraph f my t t is wh t this th calls th act *f inspe t* *Cf Principle f Logic* bk. II, pt h p II

is s along the line results from our insight into the very meaning of the word *is* and into the constitution *of any series of terms connected by that relation* It has naught to do with what any particular thing is or is not but *whatever* any *given thing may be* we see that it also is whatever *that* is indefinitely To grasp in one view a succession of *is* s is to apprehend this relation between the terms which they connect just as to grasp a list of successive equals is to apprehend their *mutual* equality throughout The principle of mediate subsumption thus expresses relations of ideal objects as such It can be discovered by a mind left at leisure with any set of meanings (however originally obtained) of which some are predicable of others The moment we string them in a serial line that moment we see that *we can drop intermediaries treat remote terms just like near ones and put a genus in the place of a species* This shows that *the principle of mediate subsumption has nothing to do with the particular order of our experiences or with the outer coexistences and sequences of terms* Were it a mere outgrowth of habit and association we should be forced to regard it as having no universal validity for every hour of the day we meet things which we consider to be of this kind or of that but later learn that they have none of the kind s properties that they *do not* belong to the kind s kind Instead however of correcting the principle by these cases we correct the cases by the principle We say that if the thing we named an M has not M s properties then we were either mistaken in calling it an M or mistaken about M s properties or else *that it is no longer M but has changed But we never say that it is an M without M s properties*

shall have M s prope [illegible]

find in the real world anything [illegible]

perception of what a lot of successive is s *mean* This perception can no more be confirmed by one set or weakened by another set of outer facts than the perception that black is not white can be confirmed by the fact that snow never blackens or weakened by the fact that photographer s paper blackens as soon as you lay it in the sun

The abstract scheme of successive predications extended indefinitely with all the possibilities of substitution which it involves is thus an immutable system *of truth which flows from the very structure and form of our thinking If* any real terms ever do fit into such a scheme they will obey its laws *whether they do is a question as to nature s facts the answer to which can only be empirically ascertained Formal logic* is the name of the Science which traces in skeleton form all the remote relations of terms connected by successive *is* s with each other and enumerates their possibilities of mutual substitution To our principle of mediate subsumption she has given various formulations of which the best is perhaps this broad expression that *the same can be substituted for the same in any mental operation*[1]

The ordinary logical series contains but three terms— Socrates man mortal But we also have Sorites —Socrates man animal machine run down

[1] Realities fall u de this only o I r as they p ve to *be* the sam So far as th y cannot be subst tuted f r e ch th r fo the purpose n h nd so far th y e not the same th u h for other purposes *and in other re p cts they might be substituted* a d then b t at d as the same Apart from purp se f c urse no real ties ever re ab olutely a d e ctly the *same*

mortal etc —and it violates psychology to represent these as syllogisms with terms suppressed The ground of there being any logic at all is our power to grasp any series as a whole and the more terms it holds the better This synthetic consciousness of an uniform direction of advance through a multiplicity of terms is apparently what the brutes and lower men cannot accomplish and what gives to us our extraordinary power of ratiocinative thought. The mind which can grasp a string of is s as a whole—the objects linked by them may be ideal or real physical mental or symbolic indifferently—can also apply to it the principle of skipped intermediaries *The logic-l st is thus in its origin and* , *ficatory lists which are credible de*

e

s

of more than two terms at once So far th u

a d Log c are seen to be nc dental results of the mere apac ty for discerning d ffere ce a d likeness wh ch capacity is a thing with which the *order of experie ce* properly so styled has absolutely nothing to do

1

Chapter xxII already gave the reason (see p 6 o above) this wo u b be a wo ld in which all things differed and in which what properties there were we e ultimate and had no farther predicates In uch a world there would be as many kinds as there were separate things We could never subsume a new thing under an old kind or if we could no consequences would follow Or again this might be a world in which innumerable things were of a kind but in which no concrete thin remained of the same kind lon but all objects were in a flux Here again though we could subsume and infer our logic would be of no practical use to us for the subjects of our propos tions would have chan ed whilst we were talking In such worlds logical relations would obtain and be known (doubtless) as they are now but they would form a merely theoretic scheme a h f e f r the conduct of life But our wo ld is no such world It is a

them cohere indissolubly and are always found together *Wh ch* things these lat

kind so remote that we could ne er ha e directly perceived the connect on The

A mind in ther w ds, which has g t *beyond* th merely *dick t mic* styl f th ght which Wundt alleges t be the essential f rm f human thinki g (*Phy l P y k* II, p. 3)

flight to this last kind *over the heads of the intermediaries* is the essential feature of the intellectual operation here Evidently it is a pure outcome of our sense for apprehending serial increase and unlike the several *propositions* themselves which make up the series (and which may all be empirical) it has nothing to do with the time and space order in which the things have been experienced

Mathematical Relations

So much for the *a priori* necessities called systematic classification and logical inference The other couplings of data which pass for *a priori* necessities of thought are the *mathematical* judgments and certain metaphysical propositions These latter we shall consider farther on As regards the mathematical judgments they are all rational propositions in the sense defined on p 868 for *they express results of comparison and nothing more* The mathematical sciences deal with similarities and equalities exclusively and not with coexistences and sequences Hence they have in the first instance no connection with the order of experience The comparisons of mathematics are between numbers and extensive magnitudes giving rise to arithmetic and geometry respectively

Number seems to signify primarily the strokes of o
nating things These strol [illegible]

[illegible] ıgs which any one given phe
[illegible] depends in the last instance on our way of taking it A globe is one if undivided two if composed of hemispheres A [illegible]
twenty thousand thing [illegible]

[illegible] formed This like all lists of
[illegible] re is a direction of serial increase carries with it the sense of those mediate relations between its terms which we expressed by the axiom *the more than the more is more than the less* That axiom seem[illegible] n fact only a way of stating that the term[illegible] in addition to
[illegible] counting We
[illegible] we feel that
[illegible] rokes themselves We m[illegible]
through or count 7 and [illegible]
same

[1] Said to be express[illegible] ial A i m (Arithmetic (+b)+c=
a+(b+c)

are equal comes in here.[1] The principle of constancy in our meanings, when applied to strokes of counting, also gives rise to the axiom that the same number operated on (interrupted, grouped) in the same way will always give the same result or be the same. How shouldn't it? Nothing is supposed changed.

Arithmetic and its fundamental principles are thus independent of our experiences or of the order of the world. The matter of arithmetic is *mental matter*; its principles flow from the fact that the matter forms a series which can be cut into by us wherever we like without the matter changing. The empiricist school has strangely tried to interpret the truths of number as results of coexistences among outward things. John Mill calls number a physical property of things. *One*, according to Mill, means one sort of passive sensation which we receive, two another, three a third. The same things, however, can give us different number-sensations. Three things arranged thus, for example, impress us differently from three things arranged thus, But experience tells us that every real object-group which can be arranged in one of these ways can always be arranged in the other also; and that 2 + 1 and 3 are thus modes of number in things which coexist invariably with each other. The indefeasibility of our belief in their coexistence (which is Mill's word for their equivalence) is due solely to the enormous amount of experience we have of it. For all things, whatever other sensations they may give us, give us at any rate number-sensations. Those number-sensations which the same thing may be successively made to arouse are the numbers which we deem equal to each other; those which the same thing refuses to arouse are those which we deem unequal.[2]

This is as clear a restatement as I can make of Mill's doctrine. And its failure is written upon its front. Woe to arithmetic, were such the only grounds for its validity! The same real things are countable in numberless ways, and pass from one numerical form, not only to its equivalent (as Mill implies), but to its other, as the sport of physical accidents or of our mode of attending may decide. How could our notion that one and one are eternally and necessarily two ever maintain itself in a world where every time we add one drop of water to another we get not two but one again? in a world where every time we add a drop to a crumb of quicklime we get a dozen or more?—had it no better warrant than such experiences. At most we could then say that one and one are *usually* two. Our arithmetical propositions would never have the confident tone which they now possess. That confident tone is due to the fact that they deal with abstract and ideal numbers exclusively. *What we mean* by one plus one is two; we *make* two out of it; and it would mean two still even in a world where *physically* (according to a conceit of Mill's) a third thing was engendered every time one thing came together with another. We are masters of our meanings, and discriminate between the things we mean and our ways of taking them, between our strokes of enumeration themselves and our bundlings and separatings thereof.

Mill ought not only to have said, 'All things are numbered'; he ought, in order to prove his point, to have shown that they are *unequivocally* numbered, which they notoriously are not. Only the abstract numbers themselves are un-

[1] Compare Helmholtz's more technically expressed essay 'Zählen u. Messen,' in the *Philos. Aufsätze Ed. Zeller gewidmet* (Leipzig, 1887), p. 17.

[2] For the original statements, cf. J. S. Mill, *Logic*, bk. ii, chap. vi, §§ 2, 3, and bk. iii, chap. xxiv, § 5.

equivocal only those which we create mentally and hold fast to as ideal objects always the same A concrete natural thing can always be numbered in a great variety of ways We need only conceive a thing divided into four equal parts (and all things may be conceived as so divided) as Mill is himself compelled to say to find the number four in it and so on

The relation of numbers to experience is just like th ... logic. So long as an experien ... ong as it ... r things ... g their kinds ... elements are ... e elements are sensibly ... pounds sensibly one Unle ...

... modern science outdoes it by denying that compounds exist at all There is no such thing as water for science that is only a handy name for H_2 and O when they have got into the position H O-H and then affect our senses in a novel way The modern theories of atoms of heat and of gases are in fact only intensely artificial devices for gaining that constancy in the numbers of things which sensible experience will not show Sensible things are not the things for me says Science because in their changes they will not keep their numbers the same Sensible qualities are not the qualities for me because th ... at all These hypo ...

suc ...
per ...

The other branch of mathematics is *geometry* Its objects are also ideal creations Whether nature contain circles or not *I can know what I mean by a circle and can stick to my meaning* and when I mean two circles I mean two things of an identical kind The axiom of constant results (see above p 869) holds in geometry The same forms treated in the same way (added subtracted or compared) give the same results—how shouldn t they? The axioms of mediate comparison (p 869) of logic (p 871) and of number (p 871) all ... the forms which we imagine ...

... of us only as they are of other mental conceptions there are certain axioms relative to space-forms exclusively wh h we must briefly consider

lel

... due to an intuitive acquaintance with the properties of space It is neither We experience lines enough which pass

through two points only to separate again only we won t call them straight Similarly of planes and parallels. We have a definite idea of what we mean by each of these words and when something different is offered us we see the difference. Straight lines planes and parallels as they figure in geometry are mere inventions of our faculty for apprehending serial increase. The farther continuations [illegible] *ll* bear the same relation to their last visible parts w[illegible] iom of skippe[illegible] these figures [illegible] ous parts do [illegible] us care for these forms gives them their beauty and stamps them [illegible] ceptions in our mind But obviously if two lines or two planes with a common segment, were to part company beyond the segment it could only be because the direction of at least one of them had changed Parting company in lines and planes *means* changing direction, means assuming a new relation to the parts that pre-exist and assuming a new relation means ceasing to be straight or plane If we mean by a parallel a line that will never meet a second line and if we have one such line drawn through a point, any new line drawn through that point which does not coalesce with the first must be inclined to it and if inclined to it must approach the second, i.e., cease to be parallel with it. No properties of outlying space need come in here only a definite conception of uniform direction, and constancy in sticking to one s point.

The other two axioms peculiar to geometry are that figures can be moved in space without change and that no variations in the way of subdividing a given amount of space alters its total quantity This last axiom is similar to what we f und to obtain in numbers. The whole is equal to its parts is an abridged way of expressing it. A man is not the same biological whole if we cut him in two at the neck as if we divide him at the ankles but geometrically he is the same whole, no matter in which place we cut him. The axiom about figures being movable in space is rather a postulate than an axiom. *So far as they are so movable*, then certain fixed equalities and differences obtain between forms *no matter where traced*. But if translation through space warped or magnified forms then the relations of equality etc., would always have to be expressed with a position-qualification added. A geometry as absolutely certain as ours could be invented on the supposition of such a space if the laws of its warping and deformation were fixed. It would however be much more complicated than our geometry which makes the simplest possible supposition and finds luckily enough, that it is a supposition with which the space of our experience seems to agree

By means of these principles all playing into each other s hands the mutual equivalences of an immense number of forms can be traced even of such as at first sight bear hardly any resemblance to each other We move and turn them mentally and find that parts of them will superpose. We add imaginary lines which subdivide or enlarge them and find that the new figures resemble each other in ways which show us that the old ones are equivalent too We thus end

The subdivision itself consumes none of the space. In all practical experience our subdivisions do consume space. They consume it in our geometrical figures. But f[illegible] sim[illegible]ty's sake, in geometry we postulate subdivisions which violate experience and consume none of it.

by expressing all sorts of *forms in terms of other forms* enlarging our kno ... of the kinds of things which certain other kinds of ... are equivalent

Th ...
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... whether the figures we speak of have ... experienced or not

Consciousness of Serie ...

C ...
the
con

... rections of ... *ousness of series is a human perfec*... ... gradually evolved and wh... ries greatly from man to man There is no acco... l associations among our ... actors whatever they be ... Once this consciousness is attained to however ... *ulate* thought becomes possible with *our very awareness of a series may* go an awareness that dropping terms out of it will leave identical relations between the terms that remain and thus arises a perception of relations between things so naturally separate that we should otherw... d them together at all

Th ...

purely
about ... series of homogeneously re... ... to each other as the near ones are ... be untrue The series A is not B is not C is not D does not permit the relation to be traced between remote terms From two negations no *inference can be drawn Nor to become more concrete does the lover of a* woman generally love her beloved or the contradictor of a contradictor contradict whomever he contradicts The slayer of ... s victim the acquaint... c

... iaries and transfer of relations occurs within homogeneous series But not all homogeneous series allow of intermediaries being skipped and relations transferred It depends on which series they are on what relations they contain [1] *Let it not be said that it is a mere matter of verbal association* due to the fact that language sometimes permits us to transfer the *name*

[1] *Cf* A De Morgan *Syllabus of a P... sed System of Logic* (1860) pp 46-56

of a relation over skipped intermediaries and sometimes does not, as where we call men 'progenitors' of their remote as well as of their immediate posterity, but refuse to call them 'fathers' thereof. There are relations which are *intrinsically* transferable, whilst others are not. The relation of *condition*, e.g., is intrinsically transferable. What conditions a condition conditions what it conditions—'cause of cause is cause of effect.' The relations of negation and *frustration*, on the other hand, are not transferable: what frustrates a frustration does *not* frustrate what it frustrates. No changes of terminology would annul the intimate difference between these two cases.

Nothing but the clear sight of the ideas themselves shows whether the axiom of skipped intermediaries applies to them or not. Their connections, immediate and remote, flow from their inward natures. We try to consider them in certain ways, to bring them into certain relations, and we find that sometimes we can and sometimes we cannot. *The question whether there are or are not inward and essential connections between concerned objects as such, really is the same thing as the question whether we can get any new perception from mentally coupling them together, or pass from one to another by a mental operation which gives a result.* In the case of some ideas and operations we get a result, but no result in the case of others. Where a result comes, it is due exclusively to the *nature* of the ideas and of the operation. Take blueness and yellowness, for example. We can operate on them in some ways, but not in other ways. We can compare them, but we cannot add one to or subtract it from the other. We can refer them to a common kind, color, but we cannot make one a kind of the other, or infer one *from the other.* This has *nothing to do with experience. For we can add blue pigment* to yellow *pigment,* and subtract it again, and get a result both times. Only we know perfectly that this is no addition or subtraction of the blue and yellow qualities or natures themselves.

There is thus no denying the fact that *the mind is filled with necessary and eternal relations which it finds between certain of its ideal conceptions, and which form a determinate system, independent of the order of frequency in which experience may have associated the conceptions' originals in time and space.*

Shall we continue to call these sciences 'intuitive,' 'innate,' or '*a priori*' bodies of truth, or not? Personally I should like to do so. But I hesitate to use

Cf. Locke, *Essay concerning Human Understanding,* bk. II, chap. xvii, § 6.

Some readers may expect me to plunge into the old debate as to whether the *a priori* truths are 'analytic' or 'synthetic.' It seems to me that the distinction is one of Kant's most unhappy legacies, for the reason that it is impossible to make it sharp. No one will say that such analytic judgments as '*equidistant lines can nowhere meet*' are *pure tautologies.* The predicate is somehow in a way involved, as well as found among the objects. There is something of ampliation in our greatest truisms, our state of mind is richer after than before we have uttered them. This being the case, the question 'at what point does the new state of mind cease to be *implicit* in the old?' is too vague to be answered. The only sharp way of defining synthetic propositions would be to say that they express a relation between two *data* at least. But it is hard to find any proposition which cannot be construed as doing this. Even verbal definitions do it. Such painstaking attempts as that latest one by Mr. D. G. Thompson to prove all necessary judgments to be analytic (*System of Psychology,* ii, p. 232 ff.) seem accordingly but *[illegible]* and little better than waste of ink and paper. All philosophic interest vanishes from the question, the moment

the terms on account of the *odium* which by their controversial history has been made the whole of their connotation for many worthy persons The most politic way not to alienate these readers is to flourish th ~ of the immortal Locke For in truth I h mo th)

th *triangle were once equal to two* rig *ways be equal to two right ones And hence he comes to be* certain that what was once true in the case is always true what ideas once agreed will always agree Upon this ground it is that particular demonstrations in mathematics afford general knowledge If then the perception that the same ideas will eternally have the same habitudes and relations be not a sufficient ground of knowledge there could be no knowled e of general proposition ~ l general knowledge lies only in our plation of our abstract ideas Wher amongst them there we have *gener a by putting the names of those ideas together accordingly in propositions* we can with certainty *pronounce general* truths What is once known of such ideas will be perpetually and forever true So that as to all general knowled e we must search and find it only in our minds and it is only the examining of our own ideas that furnisheth us with that Truths belonging to essences of things (that is to abstract ideas) are eternal and are to be found out only by the contemplation of those essences Knowledge is the consequence of the ideas (be they what they will) that are in our minds producing there certain general propositions Such propositions are therefore called eternal truths because being *once made about abstract ideas so as to be true* they will *whenever they can be supposed to be made again at any time past or to come by a mind having those ideas always actually be true For names being supposed to stand* perpetually *for the same* ideas and the same ideas *having immutably the same* habitudes one to another propositions concerning any abstract ideas that are once true must needs be eternal verities

But what are these verities these agreements which the *mind discovers* by barely considering its own fixed meanings except what I have sa d ' of likeness and difference imm d

l ion strokes geometry mediate ... *y of different ways of carving space None of these eternal verities has* anything to say about facts about what is or is not in the *world Logic does not* say whether Socrates men mortals or immortals *exist* arithmetic does not *tell* us where her 7 s 5 s and 12 s are to be *found* geometry affirms not that circles and rectangles are *real* All that these sciences make us sure of is that *if* these *things are anywhere to be found the eternal verities* will obtain of them

Locke accordingly *never tires of telling us that the*

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ceases to ascribe to *any a prio i* truths (whether nalyt c o synthet c) that l islative character for all possible exp rience which Kant bel ev d in We o rsel es have den d such legislative char cte and contended that t was for e pe ience itself to pro e wh th r its data can or cannot be assimulated to those id l l rms b tween wh ch *p ori* relati ns obtain The analytic synthetic deb te is thus f r us devo d of all significa ce O the whole the best recent tre tment f th qu t n kn n to m is i n *l A Sp s orks his Denken und W kucl k t I think but I c nnot n s fi d th page*

universal propo
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onl upon the knowledge of ea h ide by ... a. ...
bout which we cannot be mistaken whilst they are in our minds. The mathemati
c..n nsiders the truth and properties belonging to a rectangle or circle only s they are in idea in his own mind. For t is possible he never found either of them existing mathematically, i.e., precisely true, in his life. But yet the knowledge he has of any truths o pr perties belonging to ci cle or any other mathematical figure are nevertheless true and certain even of real things existing because real things are no far t..er co cerned nor intended to be meant by any such propositions than as things really agree to those archetypes in his mind. It is true f *the idea of a tri..n le*, that its three angles are equal to two right o es? It is true also of a trian e whe ever it eally exists. Whatever ther figure exists that is n t exactly answerable to that idea in his mind is not at all concerned in that proposition. And therefo e he is certain all his knowledge c cerning ch ideas is real kn wledge because, intending things o farthe than they gree wi h those his deas he is sure what he kn ws co cerning th se figures when they ha e barely an deal existence in his mind will hold true f them also when they ha e a real existence in matter [But] that any or what bodies d exist that we ar left for our senses to discover to us, as far as they can.

Locke acco dingly distinguishes between mental truth and real truth.[2] The former is intuitively certain the latter dependent on experience Only *hyp thet cally* can we affirm intuitive truths of real things—by *s pposing* namely that real things exist which correspond exactly with the ideal subjects of the intuitive propositions

If ur senses corroborate the supposition all goes well. But note the strange descent in Locke s hands of the dignity of *a priori* propositions By the ancients they were con dered without farther question to reveal the constitution of Reality Archetypal things existed it was assumed in the relations in which we had to think them The mind s necessities were a warrant for those of Being and t was not till Descartes time that scepticism had so advanced (in dog matic circles) that the warrant must itself be warranted and the veracity of the De ty in oked as a reason for holding fast to our natural beliefs

But the intuitive propositions of Locke leave us as regards outer reality none the better for their possession We still have to go to our senses to find what the reality is. The vindication of the intuitionist position is thus a barren vic tory The *eternal* *verities which the very structure of our mind lays hold of* do not necessarily themselves lay hold on extra mental be ngs nor have they as Kant pretended later a legislating character even for all possible experience.

Essay *H ma Understand* g, book IV chaps. IX, § I VII, 4.

Book IV chap. §§ 6 8.

Kant, by th way mad strange tactical blunder in his way f sh wing that th f rms f our ecessary th ght are underi ed from experience. H insisted th ught f rms with which experience largely gr f rgetting that th nly f rms which uld t by any possibility be th results f experience would be such as experience *violat d*. The first thing Kantian ught t d is t discover f rms f j dgment t which rder in things runs parallel. These w uld indeed be features nativ t the mind. I w this remark to Herr A. pir in whose *Denken und Wirklichkeit* t is somewhere co tained. I ha myself alread to some extent proceeded, and in th pages which f ll w shall proceed still farther to show the riginality f the mind structur in this way

They are primarily intere ing in th that we e network may be flung so that ncide

And this brings us verted our attention so ered e outer realities d velocities ex e by as these at last are things ov logical network may be flung—and by supposing wh instead of sensible phenomena science becomes yearly more able to manufacture for herself a world about which rational propositions may be framed Sensible phenomena are pure delusion ical philoso phy The things and e only

started to cast the chaos juxtapositions into a form that might seem intelli gible Many were their ideal prototypes of rational order teleological and æsthetic ties between things causal and substantial bonds as well as logical and mathematical relations The most promising of th at first were of course the richer on t promising on is a hi richer s

and the like But none of pen to your precious object in the real world Call the things of nature as much as you like by sentimental moral and æsthetic names *no natural consequences follow from the n y be of the kinds* you allege but th last great system logic in order to

other b oks a w se th r than lay th m of nature m th ks ch particul r phe lo vs from them We hould propose to ws nam ly to rec cate and exalt the mind with a pr spect of the beauty order e tent and v riety of n tural thi gs hence by pr per inferen s to nla ge our not ons of the grandeur wisd m and beneficence of the Cre tor etc etc etc (*P n ciples of Hu an Kn l dge* § 109)

But when you give things mathematical and mechanical names and call them just so many solids in just such positions describing just such paths with just such velocities all is changed Your sagacity finds its reward in the verification by nature of all the deductions which you may next proceed to make Your things realize all the *consequences* of the names by which you classed them The modern mechanico-physical philosophy of which we are all so proud because it includes the nebular cosmogony the conservation of energy the kinetic theory of heat and gases etc etc begins by saying that the *only* facts are collocations and motions of primordial solids and the only laws the changes of motion which changes in collocation bring The ideal which this philosophy strives after is a mathematical world formula by which if all the collocations and motions at a g en moment were known it would be possible to reckon those of any wished for future moment by simply considering the necessary geometrical arithmetical and logical implications Once we have the world in this bare shape we can fling our net of *a priori* relations over all its terms and pass from one of its phases to another by inward thought necessity Of course it is a world with a very minimum of rational *stuff* The sentimental facts and relations are h h red t n blow But the rat onality yielded is so superbly complete in *form*

clouds of dust which will be diss pated by the eternal cosmic weather as carelessly as they were formed

The popular notion that Science is forced on the mind *ab extra* and that

Once f r all [says Helmholtz in beginning that l ttle work of his which laid the f undatio s of the c nservation of energy] t is the task of the physical *sciences* to seek f r l by wh ch particul r p oce ses in nature may be referred to general ules a d deduced f om s ch g in Su h rules (for example the l s of reflect on or f ct on of l ght r that of Mariotte and G y Lu sac for gas volumes) are c i dently othi g but generic o cepts for emb cing whole class s of ph mena The ea ch f them th b f the experimental di on of ou Sc ence Its theo etic di n n the other h nd tries to discover the u kn n c uses of proces es f om their sible ffect t es to und tand them by the l w of causality The ultimate goal *of th o etic* physi s s t fi d tl e l st *uncl ang* g auses of the processes Natu Wh th ll p ces es be eally asc bable to such causes whether th wo ds t b *c mpl tely tell g bl* o whethe the e be changes which w uld el d th law of necessary ca l ty nd fall t a realm f pontan ty or f ed m t he e the pl to determine but t any rate it is clear th t the Sc ence

Th postulate th t natu al ph ome must b educed to cha g l s ult mate auses ext hapes it elf so that *f ces u cha g d by t m* must b found to be th e causes

They are primarily interesting only as subjective facts They stand waiting in the mind forming a beautiful ideal network and the most we can say is that we *hope* to discover outer realities over which the network may be flung so that ideal and real may coincide

And this brings us back to science from which we diverted our attention so long ago (see p 866) *Science thinks that she has discovered the outer realities* in question Atoms and ether with no properties but masses and velocities expressible by numbers and paths expressible by analytic formulas these at last are things over which the mathematico logical network may be flung—and by supposing which instead of sensible phenomena science becomes yearly more able to manufacture for herself a world about which rational propositions may be framed Sensible phenomena are pure delusions for the mechanical philosophy The things and qualities we instinctively believe in do not exist The *only realities are swarming solids in everlasting motion* undulatory or continued *whose expressionless and meaningless changes of position form the history* of the world and are deducible from initial collocations and habits of movement hypothetically assumed Thousands of years ago men started to cast the chaos of nature s sequences and juxtapositions into a form that might seem intelligible *Many were their ideal prototypes of rational order teleological and æsthetic* ties between things causal and substantial bonds as well as logical and *mathematical relations The most promising of these ideal systems at first were* of course the richer ones the sentimental ones The baldest and least promising *were the mathematical ones* but the *history of the latter s application is a history of steadily advancing successes* whilst that of the sentimentally richer systems is one of relative sterility and failure [1] Take those aspects of phenomena which interest you as a human being most and class the phenomena as perfect and imperfect as ends and means to ends as high and low beautiful and ugly *positive and negative harmonious and discordant* fit and unfit natural and unnatural etc and barren are all your results In the ideal world the kind precious has characteristic properties What is precious should be preserved unworthy things should be sacrificed for its sake exceptions made on its account *its preciousness is a reason for other things* actions and the like But none of these things need happen to your precious object in the real world Call the things of nature as much as you like by sentimental moral and æsthetic names no natural consequences follow from the naming They may be of the kinds you allege but they are not of *the kind s kind* and the last great system maker of this sort Hegel was obliged explicitly to repudiate logic in order to make any inferences at all from the names he called things by

[1] Yet even so late as Berkeley s time one could write As in reading other books a wise man will choose to fix his thoughts on the sense and apply it to use rather than lay them out in grammatical remarks on the language so in perusing the volume of nature methinks it is beneath the dignity of the mind to affect an exactness in reducing each particular phenomenon *to general rules or showing how it follows from them* We should propose to ourselves nobler views namely to recreate and exalt the mind with a prospect of the beauty order extent and variety of natural things hence by proper inferences to enlarge our notions of the grandeur wisdom and beneficence of the Creator etc etc etc (*Principles of Human Knowledge* § 109)

quant ty of existence is unchan ed Nature is simple and invariable Na ture acts by the shortest ways *Ex nihilo n hil fit* Nothing can be evolved which was not involved Whatever is in the effect must be in the cause A thing can only work where it is A thing can only affect another of its own kind *Cessante causa cessat et effectus* Nature makes no leaps Things k 1 d Nothing is or happens without a

them she would be *pro tanto* more intelligible and we seek ... conceive her phenomena as to show that she does obey them To a certain ex tent we succeed For example instead of the quantity of existence so vaguely postulated as unchanged Nature allows us to suppose that curious sum of distances and velocities which for want of a better term we call energy For the effect being contained in the cause Nature lets us substitute the effect *is* the cause so soon as she lets us conceive both effect and cause as the same mole cules in two successive positions —But all around these incipient successes (as all around the molecular world so soon as we add to it as its effects those illusory things of common sense which we had to butcher for its sake) there still sp eads a vast field of irrationalized fact whose items simply *are* together and from o e to another of which we can pass by no ideally rational way

It is not that these more metaphysical postulates of rationality are absolutely barren—though barren enough they were when used as the scholastics used them as mmediate propositions of fact They have a fertility as ideals and

for *some* deeper sort of inward connection between phenomena than their

Perhaps th most infl tial I all these p t lates is that th t f the w ld must be ch that weeping tatements may be made abo t it.

Consid g th use f th axi ms *m p t t supr exp m* nd *mo d t q d no hab t* in th f ll win f tats f Darwinism which I take f m the much used sch lasti mpe di m f L gi and M taphysics f Liberat 3d ed (R m 880) *H hyp th sis p t t adicit principus m taphysicæ q æ d ent tias rum ss mmut bile et ff t m p s perar co m Et quand j t Darw p cie inferior ev lvit peri m nde t hit mas m illam bilitat m? Ex jus ar ntia At nihil dat q d k b t t m us t t er nequit plus t g tio p sitio m P æter t nsf mat q æ fi gitur nat pri n p ei rv l t d t uit f S prim m mutatio rit t nt m accidentalis qualem p id m di sis turpibus m ti m Sin alterum as eritur t p fert hyp th sis darwi ia t d t ad exp m dest ndam m t mnia naturaliter tenda t ad us c nserv tionem t nisi pe act onem cont ar gentis orruant* It is m ely q estion f f ct wh th these deally p pe elations d d t btain between animal and g table ancestors and descendants. If they d t, what happens? simply this that w cann t co tin to class an m l and g tal f ts und the *k nd* betwee which th se deal el ti ns btain. Thus w an l ng all animal breeds by the me f peci cann t call g ting kind f giving. treat d scendant as an ffect f his ancest Th ideal schem f t rms and relati ns can main if y like b t t must emain purely mental and w th t pplicati t hi hich gangs its aim gait egardless f ideal sch mes Most f us, h w uld p fer to d bt wh ther ch b tr ct axi ms as that thing can t tend to t n destructio express ideal elations f important sort at all.

tter with changeless forces ... uments If then we imagine ... un alterable qualities the only changes that can ... re spatial changes i e movements and the only ... he action of the forces are spatial too or in other ... forces are motor forces dependent for their effect only on spatial relations More exactly still The phenomena of nature must be reduced to [zuruckgefuhrt conceived as classed as] motions of material points with inalterable m ... orces *acting according to space relations alone* ... B ... rela tions except their d ... ther ... orce ... so that at last the task of Physics ... to refer phenomena to ... ractive and repulsive forces whose intensit ... s task would at the

... be more candidly exp ... ption scientific and not merely poetic what ma... Helmholtz and his kin *discoverers* is that the things of N ... it to act as if they *were* of the kind ... g and dri ... y

... roughout all their movements ... e total energy of the molecules considered Its constancy or conservation gives the name to the hypothesis of molecules and central forces from which it was logically deduced

Take any other mathematico-mechanical theory and it is the same They are all translations of sensible experiences into other forms substitutions of items between which ideal relations of kind number form ... or items between which no ... t

... nces at just those times and ... e logically infer that their ideal correlates ought to be Wave hypotheses thus make us predict rings of darkness and color distortions dis persions changes of pitch in sonorous bodies moving from us etc molecule-hypotheses lead to predictions of vapor density freezing point et ... h predictions fall true

Th ...

... as bodies with no properties ... ovement to and fro

Metaphysical Axioms

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... ple of things is one The

Helmholtz *D e E haltung der K ft* (1847) pp 2–6

and it speaks often in favor of conduct quite unu ual and suicidal as far as gain ing popular approbation goes The forces which conspire to this resultant are st h elementary ideas which form the
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g rt irned only in a few fanatical heads But its overturning is

pleasures in short in a host of fundamental relations Hence *if these th ngs be our esse ce* we should be substitutable for other men and they for us in any proposition in which either of us is in olved The more fundamental and com mon the essence chosen and the more simple the reasoning [1] the more wildly radical and uncondit onal will the justice be which is a pired to Life is one lo g struggle between conclusions ba ed on abstract ways of conceivin cases and opposite conclusions prompted by our instinctive perception of them as in di dual facts The logical st ckler for justice always seems pedantic and me chan cal to the man who goes by tact nd the part cular instance and who usually makes a poor show at argument Sometimes the abstract conceiver s

As ex mpl t f th usand f ptionally d h t idi syn rasy in th g d tak this I m t quit society I w ld rath d g t th d g f m beasts d ten t mes th dang f m ks It is t p in t t d th th t I dread—it is th h t d f *man th re is m th g t hocking that I w ld rath* bm t t y j ry tha incu incr ase th h tr d f man by re ging t An th uffici t so f uicid is th t I was this m rn g t f temp w th M D glas (f f h f h) I d d t bet y my lf in th least b t I fl ted th t t b posed t the p ssibility f ch an t nc y was l gh t d hf t l bl Th disgr ce f usin an impati t d is t m rpo ing (Elt Hamm nd q t d in Henry C bb

rse had t be granted Th they t titl d t ll th ghts f h ma ty? My f end said th t h h d m t any wh uld essfully m t this eas ning

merely habitual time sequence seems to us to be The word cause is in short, an altar to an unknown god an empty pedestal still marking the place of a hoped for statue *Any* really inward belonging together of the sequent terms if *discovered would be accepted as what the word cause was meant to stand for* So we seek and seek and in the molecular systems we find a sort of inward belonging in the notion of identity of matter with change of collocation Perhaps by still seeking we may find other sorts of inward belonging even b n the molecules and those secondary qualities 1 our minds

oul s our hope that oth uld take heart onger task Na sed far beyond the point tart—is a question which only the whole future of Science and Philosophy can answer [1] Our task being Psychology we cannot even cross the threshold of that larger problem

Besides the mental structure which results in such metaphysical principles as those just considered there is a mental structure which expresses itself in

Æsthetic and M

wit e are once for all so made tha ons come before our mind one of them will seem to call for or repel the others as its companions To n extent the principle of habit will explain th conjunction is repeat or at least their dis *to explain all æsthetic judgments in this way* would be absurd for it is notorious how seldom natural experiences come up to our æsthetic demands Many of the so called metaphysical principles are at bottom only expressions of æsthetic feeling Nature is simple and invariable makes no leaps or makes nothing but leaps e neither increases nor dim etc — intellect of which *ature bjectively* t after on e as little exp *having bred inner cohesions Right* nes usualness wrongness not *mere odd* ous the facts which might be l judg ic opin man is where ne hidden oracle alone can speak

[1] *Der Philosophische Kriticismus* vol II pt I sec I chap III § 6

The mind has a nati e structure in this sense that certain of its objects, if considered together in certain ways, give definite results and that no other ways of considering and no other results are possible if the same objects be taken.

The results are relations which are all expressed by judgments of subsumption and of comparison

The judgments of subsumption are themselves subsumed under the *laws of logic*

Those f comparison are expressed in *classifications* and in the *sciences of arithmet*

Mr

mathem...

correspondin outer relations have impress...

Our consciousness of these relations no doubt has a natural genesis. But it is to be sought rather in the inner forces which have made the brain grow than in any mere paths of frequent association which outer stimuli may have ploughed in that organ

But let our sense for these relations ha e arisen as it may the relations themsel es form a fixed system of lines of cleavage so to speak in the mind by which we naturally pass from one object to another and the objects connected b these lines of cleavage are often not connected by any regular time- and pace-associations We distinguish therefore between the empirical order of things and this their rational order of comparison and so far as possible we seek to translate the former into the latter as being the more congenial of the two to our intellect

Any classification of things into kinds (especially if the kinds form series or f they successively involve each other) is a more rational way of conceiving the things than is that mere juxtaposition or separation of them as individuals in time and space which is the order of their crude perception Any assimilation of things to terms between which such classificatory relations with their remote and med ate transactions obtain is a way of bringing the things into a more rational scheme

Sol ds n motion are such terms and the mechanical philosophy is only a way of concei in nature so as to arran e its items along some of the more natural lines of cleava e of our mental structure

Other natural lines are the moral and æsthetic relations. Philosophy is still seekin to conceive things so that these relations also may seem to obtain between them

As long as things have not successfully been so conceived the moral and æsthetic relations obtain only between *e tia rationis* terms in the mind and the moral and æsthetic principles remain but postulates not propositions with regard to the real world outside

There is thus a large body of *a priori* or intuitively necessary truths. As a rule these are truths of *comparison* only and in the first instance they express relations between merely mental terms Nature however acts as if some of her realities were identical with these mental terms So far as she does this, we can make *a priori* propositions concerning natural fact. The aim of both science and philosophy is to make the identifiable terms more numerous So far it has

way is better sometimes that of the man of instinct But just as in our study of reasoning we found it impossible to lay down any mark whereby to distinguish *right* conception of a concrete case from *confusion* (see pp 671, 680) so here we can give no general rule for deciding when it is morally useful to treat a concrete case as *sui generis* and when to lump it with others in an abstract class [1]

An adequate treatment of the way in which we come by our æsthetic and moral judgments would require a separate chapter which I cannot conveniently include in this book Suffice it that these judgments express inner harmonies and discords between objects of thought and that whilst outer cohesions frequently repeated will often seem harmonious all harmonies are not thus engendered but our feeling of many of them is a secondary and incidental function of the mind Where harmonies are asserted of the real world they are obviously mere postulates of rationality so far as they transcend experience Such postulates are exemplified by the ethical propositions that the individual and universal good are one and that happiness and goodness are bound to coalesce in the same subject

Summary of What Precedes

I will now sum up our progress so far by a short summary of the most important conclusions which we have reached

[1] *You reach the Mephistophelian point of view as well as the point of view of justice by* treating cases as if they belon ed rigorously to abstract classes Pure rationalism complete immunity from prejudice consists in refusing to see that the case before one is absolutely unique It is always possible to treat the country of one s nativity the house of one s fathers the bed in which one s mother d ed nay the mother herself if need be on a naked *equality with all other spec mens of o many respecti e genera It sho s the world in a* clear frosty li ht from which all fuliginous mists of affection all s vamp lights of sentimentality are absent Straight and immed ate action becomes easy then—witness a Napo le n s or a Frederick s career But the quest on always r mains Are not the mists and vapors *wo* ... the mere law *of their ge* ... dum is *not* ... with their miserable factions and sectarian disputes their loyalties and pat o s ... clusions—their annals now become a classic heritage because men of genius took pa t an l ... *tl k* t imp rtant The process of history ...

to be take ... fa t r than another He made t ... be made immaterial by subsum ... college ball games and races wou ... of Harvard from Yale and t ... *ro d to indifference* wheth ... When we have meat befor ... good we mu t recei e *the mpre sion th* ... dead body of a b rd o of a pig and again that this Falernian is only a little g pe juice and this purple robe some she p s wool dyed with th *blood of a shell fish Such tl n are* these impressions and they reach the things th mselves nd pen trate th m a I w se what kind of things they are J st in the same ay ou ht we to act th ough l fe and wh *re there are* things which ppear mo t orthy of ur approb t o ought to lay them b re and lo k at the r orthlessness and tr p tl em of all the wo ds by which they are exalted *(Long s t anslati vi p & aph 13)*

Setting out with the unquestionable assumption that e ery new form of emotion making its appearance in the indi idual or the race is a modification of some pre-existing emotion r a compounding of several pre-existing emotions, we should be greatly aided by knowing what always are the pre-existing emotions. When for example, we find that very few if any of the lower animals show any love of accumulation and that this feeling is absent in infancy when we see that an infant in arms exhibits anger fear wond r while yet it manifests no desire of permanent possessio and that a brute which has no acquisiti e emotion can nevertheless feel attachment jealousy lo e of app obation—we may suspect that the feeling which p operty satisfies is compounded out of simpler and deeper feelings. We may conclude tl der ho e the e must exist in him a prospective gratification of h
t
f

And when as in ci ilized life, th property cquired is of a kind not conducing to one der of gratifications but is capabl f ministering to all gratifications the pleasure f acquiring p operty grows more distinct from each of th various pleasures sub-

ascribed t the killing ff of the least fearful and the preserv ti n and multiplication of th more fearful which considering the small number killed by man, is an inadequate cause, t must be ascribed to cumulated exper ences and each experience mu.t be held to ha e har in prod cing t We must co clude that in each bird that escapes with injuries inflicted by man is alarmed by the outcries f other members of th flock, there is established an association of ideas between the human aspect and the pains direct and indirect suffered f om human agency And we must further concl de that the state of consciousness which impels the bird to tak flight is at first n thing more than an ideal reproduction f those painful im-

reflex actions, t becomes too mysterious to foll w with t more f key than is given. The wh le thing becomes perfectly simple if w ppose the reflex actions to be accidental inborn idiosyncracies preserved.

This cc unt f cquisiti ness differs from ur wn. With t denyin th Associati nist account t be tru descriptio f a great deal f our proprietary feeling, we admitted in additi an entirely primiti f rm f desire. (See above, p ff.) The reader must de cide as to the plausibili es f th case. Certainly appearances are in fa f there being in us me cupidities quite disconnected with the ulterio uses f the things appropriated. The source f their fascinatio lies in their ppeal to ur aesthetic sense, and w which thereupo simply t own them Glittering hard, metalic, odd, pretty things curious things especially natural bjects that look as if they were artificial, or that mimic ther bjects,—these form clas f things which human beings snatch at as magpies snatch rags. They simply fascinate us. What h use does not contain some drawer cupboard full f senseless odd nd

... and grow daily more unsightly until at last reason triumphs ver h d propensity and sweeps them w y

proved easier to identify nature s things with mental terms of the mechanical than with mental terms of the sentimental order

The widest postulate of rationality is that the world *is* rationally intelligible throughout after the pattern of *some* ideal system The whole war of the phil osophies is over that point of faith Some say they can see their way already to the rationality others that it is hopeless in any other but the mechanical way To some the very fact that there is a world at all seems irrational Nonentity would be a more natural thing than existence for these minds One philosopher at least says that the relatedness of things to each other is irrational anyhow and that a world of relations can never be made intelligible [1]

With this I may be assumed to have completed the programme which I an nounced at the beginning of the chapter so far as the *theoretic* part of our or ganic mental structure goes It can be due neither to our own nor to our ances tors experience I now pass to those practical parts of our organic mental struc ture Things are a little different here and our conclusion though it lies in the same direction can be by no means as confidently expressed

To be as short and simple as possible I will take the case of instincts and, supposing the reader to be familiar with Chapter XXIV I will plunge *in medias res*

The Origin of Instincts

Instincts must have been either

1 Each specially created in complete form or

2 Gradually evolved

As the first alternative is nowadays obsolete I proceed directly to the second The two most prominent suggestions as to the way in which instincts may have been evolved are associated with the names of Lamarck and Darwin

Lamarck s statement is that animals have *wants* and contract to satisfy them *habits* which transform themselves gradually into so many propensities which they can neither resist nor change These *propensities* once acquired, propagate themselves by way of transmission to the young so that they come to exist in new individuals anteriorly to all exercise Thus are the same emo tions the same habits the same *instincts* perpetuated without variation from one generation to another so long as the outward conditions of existence re main the same [2] Mr Lewes calls this the theory of lapsed intelligence Mr Spencer s words are clearer than Lamarck s so that I will quote from him [3]

ale Object mit sich s lbst ide tisch und priori and the *allgemeinste aus Er pir Denken und W rkl chkeit Cf* also

I st nct

[3] It should be said that Mr Spencer s m st formal utterance about instinct is in h s *P in ciples of Psych logy* in the chapter under that name Dr Romanes has reform lated and cnt h *M tal Evol tion in A imals* chap XVII. I mu fur true of mai y ences which at first simple mo ld the nerv us system to cor po ... by simple reflex actions and afte wa ds *complex* make *it* correspo d by compound

Wild ducks hatched out by tame ones fly off But if kept close for some generations the youn„ are said to become tame

Youn sava es at a certain age will revert to the woods.

En„li„h greyhounds taken to the hi„h plateau of Mexico could not at first run well on account of rarefied air Their whelps entirely got over the difficulty

Mr Lewes somewhere[2] tells of a terrier pup whose parents had been taught to beg and who constantly threw himself spontaneously into the begging atti tude Darwin tells of a French orphan-child brought up out of France yet *shrug ng* like his ancestors.

Musical ability often increases from generation to generation in the families of musicians

The hereditarily epileptic guinea pigs of Brown Sequard whose parents had become epileptic through *surgical operations on the spinal cord or sciatic nerve* The adults often lose some of their hind toes, and the youn in addition to being epileptic, are frequently born with the corresponding toes lacking The offspring of guinea pigs whose cervical sympathetic nerve has been cut on one side will have the ear larger the eyeball smaller etc. just like the r parents after the operation Puncture of the restiform body' of the medulla will in the same animal congest and enlarge one eve and cause gangrene of one ear In the youn of such parents the same symptoms occur

Physical refinement delicate hands and feet etc appear in families well bred and rich for several generations

The nervous temperament also develops in the descendants of sedentary brain workin people.

Inebriates produce offspring in various ways degenerate

Nearsi„htedness is produced by indoor occupation for generations It has been found in Europe much more frequent among schoolchildren in towns than amon children of the same a e in the country

These latter cases are of the inheritance of structural rather than of func tional peculiarities But as structure gives rise to function it may be said that the principle is the same. Amongst other inheritances of adaptive structural change may be mentioned

The Yankee type

Scrofula rickets, and other diseases of bad conditions of life

The udders and permanent milk of the domestic breeds of cow

The fancy rabb t s ears drooping through lack of need to erect them. Dog s ass s etc in some b eeds ditto

The obsolete eves f m le and various ca e-dwelling animals

The diminished size of the win bones of domesticated ducks due to ancestral disuse of fli„ht

Ribot D l'Her dit d ed., p 6

Qu ted (with t reference) in Spencer' *Biology* vol. I, p. 47

Expr ssion f Em t ons (N Y) p 87

Adapti changes are those produced by the direct effect f tward co diti ns an organ organism. Sunburned comp exi n, horny hands, muscular toughness, are illustrations. F these and ther f cts *f* Th. Ribot *D l'Hérédité* W B Carpenter in th *C ntemporar Review* L pp 95 7 9 867 H. pence *Principle f Biol gy* pt. II, ch. VIII, IX pt III. ch XI, XII C Darwin *Animals and Plant under D m tica.* on ch. XII XIII. XIV m l B tler *Lif and Habit* T A. Knight, in *Philo T ns* 837 E

pressions which before followed man s approach that such ideal reproduction becomes more vivid and more massive as the painful experiences direct or sympathetic increase and that thus the emotion in its incipient state is *nothing else than an* aggregation of the revived pains before experienced As in the course of generations the young birds of this race begin to display a fear of man before they have been injured by him it is an unavoidable inference that the nervous system of the race has been organically modified by these experiences we have no choice but to con

the like *conditions* that *this* partial excitement has its accompanying painful consciousness and that the vague painful consciousness thus arising constitutes emotion proper—*emotion undecomposable into specific experiences and therefore seemingly h m geneous If such be the explanation of the fact in this case then it is in all cases*

counted for on the same principle And concluding this we are led strongly to suspect that the emotions in general have severally thus originated.[1]

Obviously the word emotion here means instinct as well —the actions we *call instinctive are expressions or manifestations of the emotions whose genesis* Mr Spencer describes Now if habit could thus bear fruit outside the individual life and if the modifications so painfully acquired by the parents nervous systems could be found ready made at birth in those of the young it would be hard to overestimate the importance both practical and theoretical of such an extension of its sway In principle instincts would then be assimilated to secondarily automatic habits and the origin of many of them out of tentative experiments made during ancestral lives perfected by repetition addition and association through successive generations would be a comparatively simple thing to understand

Contemporary students of instinct have accordingly been *alert* to discover all the facts which would seem to establish the possibility of such an explanation The list is not very long considering what a burden of conclusions it has to bear *Let acquisitiveness and fear of man as just argued for by* Spencer lead it off Other cases of the latter sort are the increased shyness of the woodcock noticed to have occurred within sixty years observation by Mr T A Knight and the greater shyness *everywhere shown by large than by small birds* to which Darwin has called attention Then we may add—

The propensities of pointing retrieving etc in sporting dogs which seem partly at any rate to be due to *training but which in well bred stock are* all but innate It is in these breeds considered bad for a litter of young if its sire or dam have not been trained in the field

Docility of domestic breeds of *horses and cattle*

Tameness of young of tame rabbit—young wild rabbits being invincibly timid

Young foxes are most wary in those places *where they are most severely* hunted

[1] Review of Bain in H Spencer *Illustrations of U rsal Progress* (New York, 1864) pp 311–315

dren bred on our soil To my mind the facts all point that way Similarly the better breathing of the greyhounds born in Mexico was surely due to a post natal adaptation of the pups thorax to the rarer air

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d blood of the parent In many cases

propagate to their children

There remain the inherited mutilations of the guinea pig But these are such startling exceptions to the ordinary rule with animals that they should hardly be used as examples of a typical process The docility of domestic cattle is certainly in part due to man s selection etc etc In a word the proofs form rather a beggarly array

Add to this that the writers who have tried to carry out the theory of transmitted habit with any detail are always obliged *somewhere* to admit inexplicable variation Thus Spencer allows that

> Sociality ca beg only wh thr gh some sl ght ari tio there is less te dency than u ual fo the di
> tur uffi ent t nitiate
> mal h w s diffe en
> ha g thus mmenced an
> ease t t will b furth t engthen d by th inh rited effects of h b t. [Aga
> writ f th pl a f p ty Mr Sp nce says] This f el g is not o e th t has
>
> whi h m t n t b fo e th highe p ses of mental e olut a comm n e.

hab ts St ngely nough for of ll th ngs in the world these *tricks* seem most l k ld osyncr t c vari t o s They are usually defects or oddit es wh ch the ed u at on of the indi dual the p essu e of what is really *acquired* by h m would o nt ra t b t h ch are too natu e to be epressed and b eaks through all a t fic l b rriers in his children as well as in himself

Pri pl f P y h l gy II, p 56 *Ibid* p 6 3

These are about all the facts which by one author or another have been invoked as evidence in favor of the 'lapsed intelligence' theory of the origin of instincts.

Mr Darwin's theory is that of the natural selection of accidentally produced tendencies to action.

It would [says he] be *the most serious error to suppose that the greater number of* instincts have been acquired by habit in one generation and then transmitted by inheritance in succeeding generations. It can clearly be shown that the most wonderful instincts with which we are acquainted, namely, those of the hive bee and of many *ants, could not* possibly have been thus acquired.[1] *It will* be universally admitted that *instincts are as important as corporeal structure* for the welfare of each species under its present conditions of life. Under changed conditions of life it is at least possible that slight modifications of instinct might be profitable to a species; and if it can be shown that instincts do vary ever so little, then I can see no difficulty in natural selection preserving and continually accumulating variations of instinct to any extent that may be profitable. It is thus, as I believe, that all the *most complex* and wonderful instincts have arisen. . . . I believe that the effects of habit are of quite subordinate importance to the effects of the natural selection of what may be called accidental variations of instincts—that is, of variations produced by the same unknown causes which *produce slight deviations of bodily structure*.[2]

The evidence for Mr Darwin's view is too complex to be given in this place. To my own mind it is quite convincing. If, with the Darwinian theory in mind, *one re-reads the list of examples given in favor of the Lamarckian theory*, one finds that many of the cases are irrelevant, and that some make for one side as well as for the other. This is so obvious in many of the cases that it is needless to point it out in detail. The shrugging child and the begging pup, e.g., prove somewhat too much. They are examples so unique as to suggest spontaneous variation rather than inherited habit. In other cases the observations much need corroboration, e.g., *the effects of not training for a generation in sporting dogs and race horses*, the difference between *young wild rabbits born in captivity* and young tame ones, the cumulative effect of many generations of captivity on wild ducks, etc.

Similarly, the increased wariness of the large birds, of those on islands frequented by men, of the woodcock, of the foxes, may be due to the fact that the bolder families have been killed off, and *left none but the naturally timid* behind, *or simply to the individual experience of older birds being imparted by example* to the young so that a new *educational tradition* has occurred.—The cases of physical refinement, nervous temperament, Yankee type, etc., also need much more discriminating treatment than they have yet received from the Lamarckians. There is no real evidence that physical refinement and nervosity tend to accumulate from generation to generation in *aristocratic or intellectual families*; nor is there any *that the change in that direction* which Europeans trans-*planted to America* undergo is not all completed in the first generation of chil

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Dupuy, in the *Popular Science Monthly*, vol. xt, p. 332; F. Papillon, *Nature and Life*, p. 330; Crothers, in the *Popular Science Monthly*, Jan. (or Feb.) 1889.

[1] Because being inhabited by neuter insects the effects of mere practice cannot accumulate from one generation to another.—W. J.

[2] *The Origin of Species*, chap. VII.

The stron f the I imarchian theory remains
the *a priori*
by the way
Since says
independen
accidental var ations alone the amount of mutual adaptation and
we now find there could hardly possibly have come about in any finite time We must rather suppose that the divers varyin parts *brought* the other parts into harmony with themselves by *exercising them ad hoc* and that the effects of the exercise remained and were passed on to the young This forms of course a great *presumpt on* against the all sufficiency of the vie v of selection of acci dental variations exclusively But it must be admitted that in favor of the con trary view that adaptive changes are inherited we have as yet perhaps not one single unequivocal item of positive proof

I

a d metaph cal propositions go such an assertion is not only untrue but alto-

ing men

The causes of our mental structure are doubtless natural and connected like all our other pecul arities with those of our nervous structure Our interests our

which at p esent we can gi e no account E en in the clearest parts of Psy

one perceives the slowly gathering twilight close in utter n ght

I leave my text practically just as it was written in 1885 I proceeded at that time to draw a tentative conclusion to the effect that the origin of *most* of our instincts must certainly be deemed fruits of the back door method of genesis and not of ancestral experience in the proper meaning of the term Whether acquired ancestral habits played any part at all in their production was still an open question in which it would be as rash to affirm as to deny Already before that time however Professor Weismann of Freiburg had begun a very serious attack upon the Lamarckian theory [1] and his nol m c has at last excited such a widespread intere t m om almost unhesitatingly

any peculiarity acquired parent should be transmitted to the germ Into the nature of that theory this is not the place to go Suffice to say that it has made him a keener critic of Lamarck s and Spencer s theory than he otherwise might have been The only way in which the germinal n od ts can be influenced whilst in the body of the n h nu trition lto gether or other vi ea But peculiarities of neural structure in the parents *which the parent* *ot born with* they can never co coinci o idio- nerations in virtue of the no one doubts Refe

e Bernoullis Mozart etc) that the talent being kept in exercise it ought to have gone on growing for an indefinite number of generatio it quickly reaches a ma

a pathologic change in conse e original traumatic injury The obsolescence of disused organs he explains very satisfactorily without invoking any transmission of the direct effects of disuse by his theory of *panmixy* for which I must refer to his own writings Finally he criticises searchingly the stories we occasionally hear of inherited mutilations in animals (dogs ears and tails etc) and cites a prolonged series of experiments of his own on mice which he bred for many generations cutting off both parental tails each time without interfering in the least with the length of tail with which the young continued to be born

[1] We smann *Über d e Ve e bu g* (Jena 1883) These *Ess ys on H dity* ha e recently (1889) been published in En lish in a c llect d f rm

[2] Best expressed i the es y n the *C t nu t d Keimplasmas* (1885)